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THE ABRIDGMENT 1919

CONTAINING THE ANNUAL MESSAGE
OF THE PRESIDENT OF THE UNITED STATES
TO THE TWO HOUSES OF CONGRESS

66TH CONGRESS, 2D SESSION

WITH REPORTS OF DEPARTMENTS
AND SELECTIONS FROM ACCOMPANYING
PAPERS

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CONTENTS.

	Page.
Message of the President.....	5
Report of the Secretary of the Treasury.....	17
Report of the Secretary of War.....	259
Final Report of Gen. John J. Pershing.....	345
Report of the Attorney General.....	671
Report of the Postmaster General.....	773
Report of the Secretary of the Navy.....	889
Report of the Secretary of the Interior.....	1037
Report of the Secretary of Agriculture.....	1225
Report of the Secretary of Commerce.....	1577
Report of the Secretary of Labor.....	1745
Index.....	1943

14270

ANNUAL MESSAGE OF THE PRESIDENT.

TO THE SENATE AND HOUSE OF REPRESENTATIVES:

I sincerely regret that I cannot be present at the opening of this session of the Congress. I am thus prevented from presenting in as direct a way as I could wish the many questions that are pressing for solution at this time. Happily, I have had the advantage of the advice of the heads of the several executive departments who have kept in close touch with affairs in their detail and whose thoughtful recommendations I earnestly second.

In the matter of the railroads and the readjustment of their affairs growing out of federal control, I shall take the liberty at a later date of addressing you.

I hope that Congress will bring to a conclusion at this session legislation looking to the establishment of a budget system. That there should be one single authority responsible for the making of all appropriations and that appropriations should be made not independently of each other, but with reference to one single comprehensive plan of expenditure properly related to the nation's income, there can be no doubt. I believe the burden of preparing the budget must, in the nature of the case, if the work is to be properly done and responsibility concentrated instead of divided, rest upon the executive. The budget so prepared should be submitted to and approved or amended by a single committee of each House of Congress and no single appropriation should be made by the Congress, except such as may have been included in the budget prepared by the executive or added by the particular committee of Congress charged with the budget legislation.

Another and not less important aspect of the problem is the ascertainment of the economy and efficiency with which the moneys appropriated are expended. Under existing law the only audit is for the purpose of ascertaining whether expenditures have been lawfully made within the appropriations. No one is authorized or equipped

to ascertain whether the money has been spent wisely, economically and effectively. The auditors should be highly trained officials with permanent tenure in the Treasury Department, free of obligations to or motives of consideration for this or any subsequent administration, and authorized and empowered to examine into and make report upon the methods employed and the results obtained by the executive departments of the Government. Their reports should be made to the Congress and to the Secretary of the Treasury.

I trust that the Congress will give its immediate consideration to the problem of future taxation. Simplification of the income and profits taxes has become an immediate necessity. These taxes performed indispensable service during the war. They must, however, be simplified, not only to save the taxpayer inconvenience and expense, but in order that his liability may be made certain and definite.

With reference to the details of the Revenue Law, the Secretary of the Treasury and the Commissioner of Internal Revenue will lay before you for your consideration certain amendments necessary or desirable in connection with the administration of the law—recommendations which have my approval and support. It is of the utmost importance that in dealing with this matter the present law should not be disturbed so far as regards taxes for the calendar year 1920, payable in the calendar year 1921. The Congress might well consider whether the higher rates of income and profits taxes can in peace times be effectively productive of revenue, and whether they may not, on the contrary, be destructive of business activity and productive of waste and inefficiency. There is a point at which in peace times high rates of income and profits taxes discourage energy, remove the incentive to new enterprise, encourage extravagant expenditures and produce industrial stagnation with consequent unemployment and other attendant evils.

The problem is not an easy one. A fundamental change has taken place with reference to the position of America in the world's affairs. The prejudice and passions engendered by decades of controversy between two schools of political and economic thought,—the one believers in protection of American industries, the other believers in tariff for revenue only,—must be subordinated to the single consideration of the public interest in the light of utterly changed conditions. Before the war America was heavily the debtor of the rest of the world and the interest payments she had to make to foreign countries on American securities held abroad, the expenditures of American travelers abroad and the ocean freight charges she had to pay to others, about balanced the value of her pre-war favorable balance of trade. During the war America's exports have been greatly stimulated, and increased prices have increased their value. On the other

hand, she has purchased a large proportion of the American securities previously held abroad, has loaned some \$9,000,000,000 to foreign governments, and has built her own ships. Our favorable balance of trade has thus been greatly increased and Europe has been deprived of the means of meeting it heretofore existing. Europe can have only three ways of meeting the favorable balance of trade in peace times: by imports into this country of gold or of goods, or by establishing new credits. Europe is in no position at the present time to ship gold to us nor could we contemplate large further imports of gold into this country without concern. The time has nearly passed for international governmental loans and it will take time to develop in this country a market for foreign securities. Anything, therefore, which would tend to prevent foreign countries from settling for our exports by shipments of goods into this country could only have the effect of preventing them from paying for our exports and therefore of preventing the exports from being made. The productivity of the country greatly stimulated by the war must find an outlet by exports to foreign countries and any measures taken to prevent imports will inevitably curtail exports, force curtailment of production, load the banking machinery of the country with credits to carry unsold products and produce industrial stagnation and unemployment. If we want to sell, we must be prepared to buy. Whatever, therefore, may have been our views during the period of growth of American business concerning tariff legislation, we must now adjust our own economic life to a changed condition growing out of the fact that American business is full grown and that America is the greatest capitalist in the world.

No policy of isolation will satisfy the growing needs and opportunities of America. The provincial standards and policies of the past, which have held American business as if in a strait-jacket, must yield and give way to the needs and exigencies of the new day in which we live, a day full of hope and promise for American business, if we will but take advantage of the opportunities that are ours for the asking. The recent war has ended our isolation and thrown upon us a great duty and responsibility. The United States must share the expanding world market. The United States desires for itself only equal opportunity with the other nations of the world, and that through the process of friendly cooperation and fair competition the legitimate interests of the nations concerned may be successfully and equitably adjusted.

There are other matters of importance upon which I urged action at the last session of Congress which are still pressing for solution. I am sure it is not necessary for me again to remind you that there is one immediate and very practicable question resulting from the

war which we should meet in the most liberal spirit. It is a matter of recognition and relief to our soldiers. I can do no better than to quote from my last message urging this very action:

"We must see to it that our returning soldiers are assisted in every practicable way to find the places for which they are fitted in the daily work of the country. This can be done by developing and maintaining upon an adequate scale the admirable organization created by the Department of Labor for placing men seeking work; and it can also be done, in at least one very great field, by creating new opportunities for individual enterprise. The Secretary of the Interior has pointed out the way by which returning soldiers may be helped to find and take up land in the hitherto undeveloped regions of the country which the Federal Government has already prepared or can readily prepare for cultivation and also on many of the cutover or neglected areas which lie within the limits of the older states: and I once more take the liberty of recommending very urgently that his plans shall receive the immediate and substantial support of the Congress."

In the matter of tariff legislation, I beg to call your attention to the statements contained in my last message urging legislation with reference to the establishment of the chemical and dyestuffs industry in America:

"Among the industries to which special consideration should be given is that of the manufacture of dyestuffs and related chemicals. Our complete dependence upon German supplies before the war made the interruption of trade a cause of exceptional economic disturbance. The close relation between the manufacture of dyestuffs, on the one hand, and of explosives and poisonous gases, on the other, moreover, has given the industry an exceptional significance and value. Although the United States will gladly and unhesitatingly join in the programme of international disarmament, it will, nevertheless, be a policy of obvious prudence to make certain of the successful maintenance of many strong and well-equipped chemical plants. The German chemical industry, with which we will be brought into competition, was and may well be again, a thoroughly knit monopoly capable of exercising a competition of a peculiarly insidious and dangerous kind."

During the war the farmer performed a vital and willing service to the nation. By materially increasing the production of his land, he supplied America and the Allies with the increased amounts of food necessary to keep their immense armies in the field. He indispensably helped to win the war. But there is now scarcely less need of increasing the production in food and the necessities of life. I ask the Congress to consider means of encouraging effort along these

lines. The importance of doing everything possible to promote production along economical lines, to improve marketing, and to make rural life more attractive and healthful, is obvious. I would urge approval of the plans already proposed to the Congress by the Secretary of Agriculture, to secure the essential facts required for the proper study of this question, through the proposed enlarged programmes for farm management studies and crop estimates. I would urge, also, the continuance of federal participation in the building of good roads, under the terms of existing law and under the direction of present agencies; the need of further action on the part of the States and the Federal Government to preserve and develop our forest resources, especially through the practice of better forestry methods on private holdings and the extension of the publicly owned forests; better support for country schools and the more definite direction of their courses of study along lines related to rural problems; and fuller provision for sanitation in rural districts and the building up of needed hospital and medical facilities in these localities. Perhaps the way might be cleared for many of these desirable reforms by a fresh, comprehensive survey made of rural conditions by a conference composed of representatives of the farmers and of the agricultural agencies responsible for leadership.

I would call your attention to the widespread condition of political restlessness in our body politic. The causes of this unrest, while various and complicated, are superficial rather than deep seated. Broadly, they arise from or are connected with the failure on the part of our Government to arrive speedily at a just and permanent peace permitting return to normal conditions, from the transfusion of radical theories from seething European centers pending such delay, from heartless profiteering resulting in the increase of the cost of living, and lastly from the machinations of passionate and malevolent agitators. With the return to normal conditions, this unrest will rapidly disappear. In the meantime, it does much evil. It seems to me that in dealing with this situation Congress should not be impatient or drastic but should seek rather to remove the causes. It should endeavor to bring our country back speedily to a peace basis, with ameliorated living conditions under the minimum of restrictions upon personal liberty that is consistent with our reconstruction problems. And it should arm the Federal Government with power to deal in its criminal courts with those persons who by violent methods would abrogate our time-tested institutions. With the free expression of opinion and with the advocacy of orderly political change, however fundamental, there must be no interference, but towards passion and malevolence tending to incite crime and insurrection under guise of political evolution there should be no

leniency. Legislation to this end has been recommended by the Attorney General and should be enacted. In this direct connection, I would call your attention to my recommendations on August 8th, pointing out legislative measures which would be effective in controlling and bringing down the present cost of living, which contributes so largely to this unrest. On only one of these recommendations has the Congress acted. If the Government's campaign is to be effective, it is necessary that the other steps suggested should be acted on at once.

I renew and strongly urge the necessity of the extension of the present Food Control Act as to the period of time in which it shall remain in operation. The Attorney General has submitted a bill providing for an extension of this Act for a period of six months. As it now stands it is limited in operation to the period of the war and becomes inoperative upon the formal proclamation of peace. It is imperative that it should be extended at once. The Department of Justice has built up extensive machinery for the purpose of enforcing its provisions; all of which must be abandoned upon the conclusion of peace unless the provisions of this Act are extended.

During this period the Congress will have an opportunity to make similar, permanent provisions and regulations with regard to all goods destined for interstate commerce and to exclude them from interstate shipment, if the requirements of the law are not complied with. Some such regulation is imperatively necessary. The abuses that have grown up in the manipulation of prices by the withholding of foodstuffs and other necessities of life cannot otherwise be effectively prevented. There can be no doubt of either the necessity or the legitimacy of such measures.

As I pointed out in my last message, publicity can accomplish a great deal in this campaign. The aims of the Government must be clearly brought to the attention of the consuming public, civic organizations and state officials, who are in a position to lend their assistance to our efforts. You have made available funds with which to carry on this campaign, but there is no provision in the law authorizing their expenditure for the purpose of making the public fully informed about the efforts of the Government. Specific recommendation has been made by the Attorney General in this regard. I would strongly urge upon you its immediate adoption, as it constitutes one of the preliminary steps to this campaign.

I also renew my recommendation that the Congress pass a law regulating cold storage as it is regulated, for example, by the laws of the State of New Jersey, which limit the time during which goods may be kept in storage, prescribe the method of disposing of them if kept beyond the permitted period, and require that goods released from storage shall in all cases bear the date of their receipt. It would

materially add to the serviceability of the law, for the purpose we now have in view, if it were also prescribed that all goods released from storage for interstate shipment should have plainly marked upon each package the selling or market price at which they went into storage. By this means the purchaser would always be able to learn what profits stood between him and the producer or the wholesale dealer.

I would also renew my recommendation that all goods destined for interstate commerce should in every case, where their form or package makes it possible, be plainly marked with the price at which they left the hands of the producer.

We should formulate a law requiring a federal license of all corporations engaged in interstate commerce and embodying in the license, or in the conditions under which it is to be issued, specific regulations designed to secure competitive selling and prevent unconscionable profits in the method of marketing. Such a law would afford a welcome opportunity to effect other much needed reforms in the business of interstate shipment and in the methods of corporations which are engaged in it; but for the moment I confine my recommendations to the object immediately in hand, which is to lower the cost of living.

No one who has observed the march of events in the last year can fail to note the absolute need of a definite programme to bring about an improvement in the conditions of labor. There can be no settled conditions leading to increased production and a reduction in the cost of living if labor and capital are to be antagonists instead of partners. Sound thinking and an honest desire to serve the interests of the whole nation, as distinguished from the interests of a class, must be applied to the solution of this great and pressing problem. The failure of other nations to consider this matter in a vigorous way has produced bitterness and jealousies and antagonisms, the food of radicalism. The only way to keep men from agitating against grievances is to remove the grievances. An unwillingness even to discuss these matters produces only dissatisfaction and gives comfort to the extreme elements in our country which endeavor to stir up disturbances in order to provoke governments to embark upon a course of retaliation and repression. The seed of revolution is repression. The remedy for these things must not be negative in character. It must be constructive. It must comprehend the general interest. The real antidote for the unrest which manifests itself is not suppression, but a deep consideration of the wrongs that beset our national life and the application of a remedy.

Congress has already shown its willingness to deal with these industrial wrongs by establishing the eight-hour day as the standard in every field of labor. It has sought to find a way to prevent child

labor. It has served the whole country by leading the way in developing the means of preserving and safeguarding lives and health in dangerous industries. It must now help in the difficult task of finding a method that will bring about a genuine democratization of industry, based upon the full recognition of the right of those who work, in whatever rank, to participate in some organic way in every decision which directly affects their welfare. It is with this purpose in mind that I called a conference to meet in Washington on December 1st, to consider these problems in all their broad aspects, with the idea of bringing about a better understanding between these two interests.

The great unrest throughout the world, out of which has emerged a demand for an immediate consideration of the difficulties between capital and labor, bids us put our own house in order. Frankly, there can be no permanent and lasting settlements between capital and labor which do not recognize the fundamental concepts for which labor has been struggling through the years. The whole world gave its recognition and endorsement to these fundamental purposes in the League of Nations. The statesmen gathered at Versailles recognized the fact that world stability could not be had by reverting to industrial standards and conditions against which the average workman of the world had revolted. It is, therefore, the task of the statesmen of this new day of change and readjustment to recognize world conditions and to seek to bring about, through legislation, conditions that will mean the ending of age-long antagonisms between capital and labor and that will hopefully lead to the building up of a comradeship which will result not only in greater contentment among the mass of workmen but also bring about a greater production and a greater prosperity to business itself.

To analyze the particulars in the demands of labor is to admit the justice of their complaint in many matters that lie at their basis. The workman demands an adequate wage, sufficient to permit him to live in comfort, unhampered by the fear of poverty and want in his old age. He demands the right to live and the right to work amidst sanitary surroundings, both in home and in workshop, surroundings that develop and do not retard his own health and well-being; and the right to provide for his children's wants in the matter of health and education. In other words, it is his desire to make the conditions of his life and the lives of those dear to him tolerable and easy to bear.

The establishment of the principles regarding labor laid down in the covenant of the League of Nations offers us the way to industrial peace and conciliation. No other road lies open to us. Not to pursue this one is longer to invite enmities, bitterness, and antagonisms which in the end only lead to industrial and social disaster.

The unwilling workman is not a profitable servant. An employee whose industrial life is hedged about by hard and unjust conditions, which he did not create and over which he has no control, lacks that fine spirit of enthusiasm and volunteer effort which are the necessary ingredients of a great producing entity. Let us be frank about this solemn matter. The evidences of world-wide unrest which manifest themselves in violence throughout the world bid us pause and consider the means to be found to stop the spread of this contagious thing before it saps the very vitality of the nation itself. Do we gain strength by withholding the remedy? Or is it not the business of statesmen to treat these manifestations of unrest which meet us on every hand as evidences of an economic disorder and to apply constructive remedies wherever necessary, being sure that in the application of the remedy we touch not the vital tissues of our industrial and economic life? There can be no recession of the tide of unrest until constructive instrumentalities are set up to stem that tide.

Governments must recognize the right of men collectively to bargain for humane objects that have at their base the mutual protection and welfare of those engaged in all industries. Labor must not be longer treated as a commodity. It must be regarded as the activity of human beings, possessed of deep yearnings and desires. The business man gives his best thought to the repair and replenishment of his machinery, so that its usefulness will not be impaired and its power to produce may always be at its height and kept in full vigor and motion. No less regard ought to be paid to the human machine, which after all propels the machinery of the world and is the great dynamic force that lies back of all industry and progress. Return to the old standards of wage and industry in employment are unthinkable. The terrible tragedy of war which has just ended and which has brought the world to the verge of chaos and disaster would be in vain if there should ensue a return to the conditions of the past. Europe itself, whence has come the unrest which now holds the world at bay, is an example of standpatism in these vital human matters which America might well accept as an example, not to be followed but studiously to be avoided. Europe made labor the differential, and the price of it all is enmity and antagonism and prostrated industry. The right of labor to live in peace and comfort must be recognized by governments and America should be the first to lay the foundation stones upon which industrial peace shall be built.

Labor not only is entitled to an adequate wage, but capital should receive a reasonable return upon its investment and is entitled to protection at the hands of the government in every emergency. No government worthy of the name can "play" these elements against

each other, for there is a mutuality of interest between them which the government must seek to express and to safeguard at all cost.

The right of individuals to strike is inviolate and ought not to be interfered with by any process of government, but there is a predominant right and that is the right of the government to protect all of its people and to assert its power and majesty against the challenge of any class. The government, when it asserts that right, seeks not to antagonize a class but simply to defend the right of the whole people as against the irreparable harm and injury that might be done by the attempt by any class to usurp a power that only government itself has a right to exercise as a protection to all.

In the matter of international disputes which have led to war, statesmen have sought to set up as a remedy arbitration for war. Does this not point the way for the settlement of industrial disputes, by the establishment of a tribunal, fair and just alike to all, which will settle industrial disputes which in the past have led to war and disaster? America, witnessing the evil consequences which have followed out of such disputes between these contending forces, must not admit itself impotent to deal with these matters by means of peaceful processes. Surely, there must be some method of bringing together in a council of peace and amity these two great interests, out of which will come a happier day of peace and cooperation, a day that will make men more hopeful and enthusiastic in their various tasks, that will make for more comfort and happiness in living and a more tolerable condition among all classes of men. Certainly human intelligence can devise some acceptable tribunal for adjusting the differences between capital and labor.

This is the hour of test and trial for America. By her prowess and strength, and the indomitable courage of her soldiers, she demonstrated her power to vindicate on foreign battlefields her conceptions of liberty and justice. Let not her influence as a mediator between capital and labor be weakened and her own failure to settle matters of purely domestic concern be proclaimed to the world. There are those in this country who threaten direct action to force their will upon a majority. Russia today, with its blood and terror, is a painful object lesson of the power of minorities. It makes little difference what minority it is; whether capital or labor, or any other class; no sort of privilege will ever be permitted to dominate this country. We are a partnership or nothing that is worth while. We are a democracy, where the majority are the masters, or all the hopes and purposes of the men who founded this government have been defeated and forgotten. In America there is but one way by which great reforms can be accomplished and the relief sought by classes obtained, and that is through the orderly processes of representative government. Those who would propose any other method of reform

are enemies of this country. America will not be daunted by threats nor lose her composure or calmness in these distressing times. We can afford, in the midst of this day of passion and unrest, to be self-contained and sure. The instrument of all reform in America is the ballot. The road to economic and social reform in America is the straight road of justice to all classes and conditions of men. Men have but to follow this road to realize the full fruition of their objects and purposes. Let those beware who would take the shorter road of disorder and revolution. The right road is the road of justice and orderly process.

WOODROW WILSON.

THE WHITE HOUSE,
2 December, 1919.

REPORT OF THE SECRETARY OF THE TREASURY.

ANNUAL REPORT ON THE FINANCES.

TREASURY DEPARTMENT,

Washington, November 20, 1919.

SIR: I have the honor to make the following report:

FINANCIAL CONDITIONS AND THE TREASURY'S PROGRAM.

In this period of readjustment from war to peace, of reconstruction of regions swept bare by the havoc of the greatest war of all time, of political and economic change, and of world-wide unrest and anxiety, America stands strong economically, financially, and politically among the nations of the earth. She has emerged from the colossal struggle with strength tested and unimpaired. The impious hand of the enemy has not touched any part of her fair land, and there are no waste places here to restore. A large share of the cost of the war already has been paid for by taxes and the public debt is but a fraction of our national wealth, our credit and financial structure is sound and secure, our gold reserves are the greatest in the world, prosperity flourishes in every branch of industry and in every part of the Nation, and the people of the country are fully employed.

On the other hand, there are serious and grave problems that challenge our statesmanship and our patriotism. In the train of the great physical and spiritual effort the Nation put forth in the supreme task of winning the war, it is not surprising, in the light of the experience of mankind following wars of every age, that there should appear a certain spirit of reaction that finds its concomitant in discontent and dissatisfaction. The continuation of prosperity and the financing of our domestic and foreign trade, the full and peaceful employment of labor and capital, credit expansion, speculation and the cost of living are great social and economic problems, but they are susceptible of American solution. To entertain the thought of failure in finding an effective remedy for every phase of discord and dissatisfaction in America is to shatter the hopes of mankind. The answer to these great questions, which are far less grave in the United States than elsewhere in the world, is to be found in the courage and ability and spirit of Americans and their love of the United States. These are attributes which have stood the test of time from the birth of thirteen struggling colonies to the maturity of a great nation. The men who went to Europe to fight for the freedom of the world, and their compatriots who mobilized to support them to the utmost at home, will not be

found wanting in these critical times and can be relied upon to grapple with these questions in the same indomitable and loyal spirit that won the war and with the traditional appreciation and respect of Americans for the rights of their fellowmen, in full confidence of the vindication of right and justice in every element of our life as a nation.

This spirit of optimism and hopefulness is born of the Nation's performances of the past and has its immediate revival in the great achievements of the people during the war and in the index afforded by the Treasury's favorable outlook for the future, if our course is directed along intelligent lines of efficiency and rigorous economy in public and private finance. During the 19 months of active warfare, the people of the country cheerfully contributed taxes for the support of the Government in greater measure than ever before in our history, and generously subscribed to four great popular Liberty loans. The success of these stupendous operations was made possible only by the devoted patriotism of the American people. In the highest and truest sense, the people of the country financed the war, and they deserve the credit for the great achievement. The loyal and efficient work of the organization in the Treasury, the Federal reserve banks and the Liberty loan committees, great and effective as it was, would have amounted to naught had it not sounded the note of patriotic appeal.

Since the signing of the armistice, taxes have been paid with equal willingness in even larger amounts than during the period of hostilities, although not so great as would have been necessary if the war had continued. During the year that has elapsed since the previous report of the Secretary of the Treasury, it has been necessary to issue only one popular loan—short-term Victory Liberty notes—as compared with four issues of long-term bonds in the previous 19 months. In the face of many gloomy forecasts that the Victory issue must be sold on a strictly commercial basis and that it would be impossible again to appeal to the patriotism of the American people, the loan, launched without the impulse of the enthusiasm of war, was another overwhelming success that again reflected the financial and economic strength of America and the solidarity and patriotism of the people of the country.

Tax receipts, payments of Victory loan subscriptions and the diminishing expenditures of the Government have permitted the issue of Treasury certificates of indebtedness on a decreasing scale for the purposes of temporary financing. This has been particularly true since the close of the fiscal year 1919. On October 31, 1919, the total amount of outstanding Treasury certificates, which on April 30 aggregated \$6,250,000,000, had been reduced to \$3,736,352,300, of which only \$1,634,671,000 were loan certificates. There are no maturities

of certificates to provide for prior to 1920, as the certificates maturing December 15, 1919, are more than covered by the income and profits tax installment due on that date.

In these circumstances, it is believed that the time will soon be in sight when the expenditures of the Government, including interest and sinking fund charges on the public debt, may be met by current receipts, without incurring new floating debt except Treasury certificates of indebtedness issued in anticipation of income and profits taxes. I confidently expect that by the time the cumulative sinking fund begins to operate on July 1, 1920, temporary financing will be substantially over and the certificates will have disappeared from the market except to the extent that financing may be done and certificates issued in anticipation of income and profits taxes. That is the goal toward which the Treasury is aiming, but its realization is dependent upon the continuation of taxes at the present aggregate level and the vigorous enforcement of economy.

The Treasury's financial program can best be expounded in detail through various public letters setting forth the facts as they developed in gradual stages during the early months of the current fiscal year. The condition of the Treasury and the state of the public debt on June 30, 1919, was analyzed in a letter sent to the Chairmen of the Senate Committee on Finance and the House Committee on Ways and Means early in July. That statement revealed that the Treasury was on the threshold of a more favorable period and enabled the department to confirm the announcement which had been made on April 14, 1919, to the effect that the issue of Victory notes would be the last Liberty loan and further to point out that while the ultimate amount of expenditures for the fiscal year 1920 was uncertain, it was confidently expected that the Government would be able, not only to meet its further temporary requirements for the decreasing scale of expenditure by the sale of Treasury certificates of indebtedness bearing interest at the rate of $4\frac{1}{2}$ per cent or less, but also to fund as many of these as may be desirable by the issue of short-term notes, in moderate amounts, at convenient intervals, when market conditions were favorable and upon terms advantageous to the Government.

The above announcement was the most encouraging news from the viewpoint of Government finance that the country had received since the cessation of hostilities. It was closely followed on July 25, 1919, with a statement that, allowing for all the elements of uncertainty, the Treasury had no reason to believe that the expenditures of the Government during the fiscal year 1920 would exceed the amount of revenue to be received under existing law and from the remaining installments of the Victory Liberty loan. This would mean a deficit for the year of only \$1,032,000,000 and a net increase

in the gross public debt at the end of the year by that figure, which was the amount of the deferred installments of the Victory Liberty loan. This estimate was contained in an open letter to the banking institutions of the country apprising them of the financial program for the ensuing five months, including the period of heaviest expenditure during the fiscal year 1920. The plan contemplated the resumption of the issue of loan certificates after an interval of three months, during which it had been possible to suspend the issue of such certificates by reason of the rapid decrease in the current expenditures of the Government, the very large early payments on the Victory loan, and the ready sale of tax certificates.

The progress of the certificate program and the success of the first two issues of certificates in pursuance of the plan were such as to permit the following announcement on August 25, 1919, in which the banking institutions of the country were informed that the third semimonthly issue, dated September 2, would be offered without asking them to subscribe for any specified quota:

The second semimonthly issue of Treasury certificates of indebtedness (Series B, 1920) in pursuance of the program for financing the current necessities of the Government set forth in Secretary Glass's letter of July 25, 1919, to all banks and trust companies, was oversubscribed.

The splendid response of the banking institutions of the country to the Treasury's plan for financing the current needs of the Government as set out in the Secretary's circular letter of July 25, gives assurance that the Treasury may count upon unqualified and ample support whenever needed. The success of the first two issues, which realized a total of \$1,065,953,500, has placed the Treasury in a very satisfactory cash position. This makes it possible to make the following announcements as to the program for the next few weeks:

1. There will be no fixed minimum amount for the issue of loan certificates dated September 2 and maturing February 2 (Series C, 1920). The issue will not remain open for any stated period, but will be closed without notice. Federal reserve banks will not assign quota in respect to this issue to the banking institutions of their districts.

2. There will be no issue of loan certificates upon September 15. An issue or issues of tax certificates of longer maturity may be substituted.

3. The Secretary of the Treasury has authorized the Federal reserve banks on and after Tuesday, September 2, to redeem in cash before maturity at the holder's option, at par and accrued interest to the date of such optional redemption, Treasury certificates of indebtedness of Series V J, dated April 10, 1919, and maturing September 9, 1919.

This offering of certificates without suggesting to the banks the amount that should be subscribed was a very great success and further reflected the splendid condition of the Government's credit, the investment value of these securities and the increased marketability of the certificates through redistribution by the banks to investors.

The large subscription of the three issues of certificates dated August 1, August 15, and September 2, the fortunate cash position of the Treasury, and the increasing investment demand enabled the de-

partment to advance another important step forward in the gradually developing program that was taking the Treasury out of the securities market to the greatest extent possible and revealing the continuing improvement in the situation. On September 8, the plan, as had been customary from the beginning, was varied by suspending the sale of loan certificates for the time being and offering two series of tax certificates, both dated September 15, 1919, one series maturing in six months and bearing interest at the rate of $4\frac{1}{4}$ per cent, and the other maturing in one year and bearing interest at the rate of $4\frac{1}{2}$ per cent. This was the first time in over a year that certificates had been offered at less than $4\frac{1}{2}$ per cent. In addition, it was announced that all certificate maturities prior to 1920 were provided for from tax receipts or cash in bank, which was further evidence of progress in the policy of financing the balance of the war debt so as to avoid great refunding operations by spreading maturities and meeting them, so far as may be, from tax receipts.

The response to these two offerings of tax certificates was so great that it was found desirable to close the issue in three days after September 15. The total subscriptions aggregated \$758,600,500, of which \$101,131,500 represented the $4\frac{1}{4}$ per cent six-month series and \$657,469,000 the $4\frac{1}{2}$ per cent one-year series. In view of the success of the issues it was possible to suspend for another period the offering of further loan certificates.

The international financial situation.

The international financial situation is one of great importance and in which we are seriously interested. The present position relative to foreign financing and the general policy of the Treasury concerning this vital problem should be fully stated.

Since the armistice the United States has advanced to the Governments of the Allies, as of the close of business October 31, 1919, the sum of \$2,329,257,138.55, and there remained on that date an unexpended balance of \$593,628,111.45, from the total loans of \$10,000,000,000 authorized under the Liberty loan acts.

The Treasury asked and obtained power for the War Finance Corporation to make advances up to the amount of \$1,000,000,000 for nonwar purposes and the War Finance Corporation is prepared to make such advances.

By the act approved September 17, 1919, the Federal Reserve Board is authorized to permit, until January 1, 1921, national banks to invest to a limited extent in the stock of American corporations principally engaged in such phases of international or foreign financial operations as may be necessary to facilitate exports.

The Secretary of War is authorized to sell surplus Army stores on credit.

The United States wheat director is authorized to sell wheat to Europe on credit.

The power which at present exists in the Government or governmental agencies to assist in meeting Europe's financial needs is, therefore, considerable. This power must, of course, be exercised with extreme caution and with the most careful regard for the urgent needs of our own people for an ample supply of foodstuffs and other necessities of life at reasonable prices.

The Treasury is considering with representatives of the Governments of the Allies the funding of the demand obligations which the United States holds into long-time obligations, and at the same time the funding during the reconstruction period, or say for a period of two or three years, of the interest on the obligations of foreign Governments acquired by the United States under the Liberty loan acts.

The Treasury believes that the need of Europe for financial assistance, very great and very real though it is, has been much exaggerated both here and abroad. Our hearts have been so touched by the suffering which the war left in its train, and our experience is so recent of the financial conditions which existed during the war (when men were devoting themselves to the business of destruction) that we are prone to overlook the vast recuperative power inherent in any country which, though devastated, has not been depopulated, and the people of which are not starved afterwards. We must all feel deep sympathy for the suffering in Europe to-day, but we must not allow our sympathy to warp our judgment and, by exaggerating Europe's financial needs, make it more difficult to fill them.

Men must go back to work in Europe, must contribute to increase production. The industries of Europe, of course, can not be set to work without raw materials, machinery, etc., and, to the extent that these are to be secured from the United States, the problem of financing the restoration of Europe belongs primarily to our exporters. Governmental financial assistance in the past and talk of plans for future Government or banking aid to finance exports have apparently led our industrial concerns to the erroneous expectation that their war profits, based so largely on exports, will continue indefinitely without effort or risk on their part. To them will fall the profits of the exports and upon them will fall the consequences of failure to make the exports. So soon as domestic stocks, which were very low at the time of the armistice, have been replenished, those industries which have been developed to meet a demand for great exports, paid for out of Government war loans, will be forced to close plants and forego dividends unless they maintain and develop an outlet abroad. The industries of the country must be brought to a realization of the gravity of this problem, must go out and seek markets abroad, must reduce prices at home and abroad to a reasonable level, and create

or cooperate in creating the means of financing export business. There is no reason for high commodity prices in the specter of European demand nor for high interest rates in the specter of European credits. Our fear must be that the cessation of war exports will result in closed plants, passed dividends, and general depression. The way to avoid those evils is to stimulate production and encourage industrial and commercial activity and not to burden them with high interest rates which are a deterrent to these things, but unfortunately are not a deterrent, except temporarily, in such times as these to speculation.

Since armistice day, the consistent policy of the Treasury has been, so far as possible, to restore private initiative and remove governmental controls and interferences. It has been the view of the Treasury that only thus can the prompt restoration of healthy economic life be gained. The embargoes on gold and silver and control of foreign exchange have been removed, as well as the voluntary and informal control of call money and the stock exchange loan account. The control exercised by the Capital Issues Committee over capital issues has been discontinued. Thus the financial markets of the United States have been opened to the whole world and all restrictions removed that might have hindered America's capital and credit resources, as well as its great gold reserve, from being available in aid of the world's commerce and Europe's need.

There are those who believe that the dollar should be kept at par—no more, no less—in the market of foreign exchange. If effective action were taken to carry out such a policy, it could only be done by drawing gold out of the United States when the dollar would otherwise be at a discount and by inflating credit when the dollar would otherwise be at a premium.

The dollar is now at a premium almost everywhere in the world. Its artificial reduction and maintenance at the gold par of exchange in all currencies is quite unthinkable unless we propose to level all differences in the relative credit of nations and for our gold reserve substitute a reserve consisting of the promises to pay of any nation that chooses to become our debtor. Inequalities of exchange reflect not only the trade and financial balance between two countries, but, particularly after a great war such as that we have been through, the inequalities of domestic finance. The United States has met a greater proportion of the cost of the war from taxes and bond issues than any other country. Largely as a consequence of this policy, the buying power of the dollar at home has been better sustained than has the buying power at home of the currency of any European belligerent. For the United States to determine by governmental action to depress the dollar as measured in terms of foreign exchange and to improve the position of other currencies as measured

in terms of dollars would be to shift to the American people the tax and loan burdens of foreign countries. This shifted burden would be measured by the taxes to be imposed and the further loans to be absorbed by our people as a consequence, and by increased domestic prices.

United States Government action at this time to prevent in respect to foreign exchange the ordinary operation of the law of supply and demand, which automatically sets in action corrective causes, and to prevent the dollar from going to a premium when its natural tendency is to do so, would artificially stimulate our exports, and, through the competition of export demand with domestic demand, maintain or increase domestic prices.

The view of the Governments of the Allies, I take it, is that had they (after the war control of their imports had been relaxed) attempted to continue to "peg" their exchanges here at an artificial level by Government borrowing, the effect would have been to stimulate their imports and discourage their exports, thus aggravating their already unfavorable international balances.

It is not, of course, to be expected that the breach left by the withdrawal of governmental support of exchange can be filled by private initiative until the ratification of the treaty of peace has given reasonable assurance against the political risk which, rather than any commercial or credit risk, now deters private lenders. Some progress has already been made in placing here through private channels the loans of allied and neutral European countries and municipalities. The Treasury favors the making, in our markets, of such loans, which contribute to relieve the exchanges. I am sure that when peace is consummated, and the political risk measurably removed, American exporters and European importers will lay the basis of credit in sound business transactions, and I know that American bankers will not fail then to devise means of financing the needs of the situation nor American investors to respond to Europe's demand for capital on a sound investment basis.

Meanwhile it is well to remember the invisible factors, which are always at work toward a solution of the problem. Immigrants' remittances to Europe are, and will continue to be, a very large item in rectifying the exchanges. As soon as peace is concluded foreign travel will be a further item. Another very important factor is the purchase of European securities and properties and repurchase of foreign-held American securities by American investors. But the principal factor in Europe's favor is the inevitable curtailment of her imports and expansion of her exports. These processes, of course, are stimulated by the very position of the exchanges which they tend to correct.

The exchange situation as it exists to-day and the steps which were taken for the removal of all war restrictions as rapidly as conditions would warrant may be summarized as follows:

On May 6, 1919, the Federal Reserve Board announced that thereafter licenses for the export of silver bullion or silver coin of foreign mintage would be granted freely and without condition. This was followed on June 9, 1919, by the announcement that after consultation with the Secretary of the Treasury, and with his approval, the Federal Reserve Board had recommended to the President, and the President had approved the recommendation, that the control theretofore exercised over transactions in foreign exchange and over the exportation of coin, bullion, and currency be terminated except as to the importation or exportation of ruble notes or exchange transactions with that part of Russia under the control of the so-called Bolshevik government, and except as to exchange transactions with territories in respect of which such transactions were at that time permitted only through the American Relief Administration. At the same time it was announced that until formal action was taken by the President applications for the export of gold would, like applications for the export of silver, be freely granted irrespective of amount or destination except as above stated, and that during that interim licenses required to consummate specific transactions in foreign exchange would be freely granted, except as set forth above.

On June 26, 1919, the President issued a proclamation, giving effect to the above recommendations. This was followed by the removal by the Federal Reserve Board, on June 30, of the restrictions on remittances to countries to which remittances had theretofore been permitted only through the American Relief Administration, leaving in force and effect only the prohibition against the shipment of "coin, bullion, and currency to that part of Russia now under the control of the so-called Bolshevik government, and any and all dealings or exchange transactions in Russian rubles or transfer of credit or exchange transactions with that part of Russia now under the control of the so-called Bolshevik government." On August 12, the Federal Reserve Board announced the issuance of a general license permitting the exportation from the United States of Russian rubles, provided that notice of such exportations be given to the Customs Division of the Treasury and to the Division of Foreign Exchange of the Federal Reserve Board. With the exceptions above noted, therefore, there is now no control over foreign exchange or the export of coin, bullion, or currency.

The improvement of our exchanges with neutral countries and the decline to normal, and in many cases to a very considerable discount, of the currencies of those countries which had been ruling at

considerable premium in the United States, is illustrated by the following table showing (1) the highest premiums reached by certain foreign currencies between April, 1917, and July 31, 1918; (2) the highest premiums during the month of July, 1918; (3) the premiums on November 15, 1918; and (4) the premiums or discounts of each currency as of November 1, 1919:

Table showing highest premiums reached by certain foreign currencies in New York between April, 1917, and July 31, 1918; premiums on Nov. 15, 1918, and premiums or discounts as of Nov. 1, 1919.

[Based on quotations for demand bills.]

Currency of—	Highest premium between April, 1917, and July 31, 1918.		Highest premium, July, 1918.	Premium, Nov. 15, 1918.	Discount, Nov. 1, 1919.
	Per cent.	Month in which reached.			
			<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
Sweden.....	69.78	November, 1917...	33.58	3.55	11.00
Norway.....	44.59	do.....	17.91	1.68	16.42
Denmark.....	44.59	do.....	16.79	.75	21.08
Holland.....	29.35	July, 1918.....	29.35	3.86	5.94
Switzerland.....	35.28	May, 1918.....	31.50	3.21	7.50
Spain.....	54.15	April, 1918.....	42.75	3.63	.10
India.....	23.30	September, 1917...	10.14	10.14	129.47
Japan.....	7.82	July, 1918.....	7.82	9.33	11.81
Argentina.....	12.25	December, 1917...	5.61	5.04	.24
Chile.....	78.24	June, 1918.....	75.48	31.54	14.39
Peru (cable rates).....	20.83	July, 1918.....	20.83	3.10	2.19
Bolivia (cable rates).....	10.25	December, 1917...	8.84	1.54	13.00

¹ Premium.

NOTE.—Quotations for Chile are for inconvertible paper currency and premiums are calculated upon the average value of 18.8 cents per paper peso during the first 6 months of 1914 as a base. There is, therefore, no premium or discount properly so-called.

It will be observed that of these currencies the only ones now ruling at a premium are those of Japan, Bolivia, and India. In the case of Japan and Bolivia the premium roughly measures the cost, including loss of interest, of the export of gold from the United States to those countries, and may, therefore, be regarded as a normal quotation. With a free gold market in the United States, as we now have it, the currency of no gold-standard country should rise above such moderate premium as measures the cost of transportation of gold from this country to the country in question. That is the normal maximum. The normal minimum with any gold-standard country enjoying a free gold market would be a discount equal to the transportation cost from that country to the United States.

As the above table indicates, exchange on India is selling at a very considerable premium. The situation is anomalous. The currency of India at the present time, while nominally on a gold basis, is practically on a silver basis. This is due to the fact that the circulating medium of India is the silver rupee, designed to be and formerly actually a token coin, the present market value of whose silver content, however, is far above its rated gold value as Indian currency.

That rated value is 32.44 cents per rupee, and when silver is selling at 94.37 cents per ounce of fine silver the rated value of the rupee at par, viz, 32.44 cents per rupee, is equal to the market value of its silver content. The present quotation of the Indian rupee roughly measures the present market value of the silver content of the rupee. Owing to the propensity of the natives to hoard the precious metals, the Indian Government is unwilling to permit the importation into India of unlimited amounts of gold, which would thus to all intents and purposes be lost to the world, but very considerable amounts of gold have been sent to India and placed by the Government in the reserve against rupee currency notes. The exchange rate on India, therefore, in the present circumstances, is disconnected from the value of gold and responds roughly to the value of silver in the same manner as rates of exchange on China and Hongkong. A British commission was appointed early in 1919 to investigate the entire subject of the Indian currency.

CURRENCY AND CREDIT EXPANSION.

The progressive rise in commodity prices and wages has led to considerable public discussion as to whether there existed an inflation of the currency, and whether such inflation, if it existed, was a cause contributing to high prices. The discussion led to the introduction in the Congress of a resolution requesting an inquiry into the advisability of legislation providing for the gradual reduction of the currency in circulation. The chairman of the Senate Committee on Banking and Currency requested the views of the Federal Reserve Board on the subject, and I fully concur in the answer of the board, as embodied in Gov. Harding's letter to Senator McLean, under date of August 8, 1919.

There is no escape from the conclusion that under our system currency can be issued only in response to a demand therefor as circulating medium and that such currency is automatically retired when it is no longer required as circulating medium. Currency expansion, therefore, is an effect and not a cause of advancing prices. The remedy for high prices, as stated in Gov. Harding's letter, is "to work and to save; to work regularly and efficiently in order to produce and distribute the largest possible volume of commodities; and to exercise reasonable economies in order that money, goods, and services may be devoted primarily to the liquidation of debt and to the satisfaction of the demand for necessities, rather than to indulgence in extravagances or the gratification of a desire for luxuries."

Credit expansion must be carefully distinguished from currency expansion. The primary cause of high prices was the demand for commodities by the European belligerents before our entry into the war and by the United States and the European belligerents com-

bined after our entry into the war. So far as the United States Government was concerned, payment by the Government for war commodities rendered inevitable a certain measure of credit expansion, as it was impossible to bring about at once a restriction of private consumption by our people commensurate with the growing needs of the Government. This credit expansion, therefore, was the effect of the war demand for commodities by the United States Government and a necessary concomitant of that demand. The primary cause of high prices was war demand for commodities; credit expansion was a necessary concomitant thereof, and currency expansion an effect of the rise of prices.

ECONOMY.

Accepting a warning from the innumerable requests that are constantly being pressed upon the Congress for grants from the general fund, it becomes the clear duty of this department to point out that there appears to be grave danger that the extraordinary success of the Treasury in financing the stupendous war expenditures may lead to a riot of public expenditure after the war, the consequences of which could only be disastrous. It can not be too often repeated or too strongly urged that the optimistic outlook of the future of the Government's finances, as presented in the beginning of this report, is based upon the practice of the most rigid economy and the continuance of ample revenues from taxation. Any other policy means a calamitous upsetting of the entire program.

Government expenditure is, I need scarcely say, the most vital, fundamental factor in increasing the cost of living. Its evil effect in that respect is mitigated, but can not be wholly eliminated, by the wisdom and practical success of the financial measures adopted by the Government to meet its expenditures. Roughly speaking, the worst of these methods (which has been adopted in greater or less degree in the countries of Europe and not at all in the United States) is currency inflation. Far less harmful as a means of financing Government expenditures is the issue of bonds, notes, and other obligations of the Government, which, to the extent that they find lodgment in the hands of investors who pay for them from savings, are a means of meeting expenditures without expansion. The least harmful of all means of meeting Government expenditures is taxation, because this enforces a considerable measure of saving on the part of the taxpayer, who is not, as in the case of loans, furnished with a new basis of credit in exchange for the buying power he transfers to the Government. Of taxes the least harmful is the personal-income tax, graduated in accordance with the means of the taxpayer, since this is a direct tax and is only with great difficulty and to a limited extent shifted to the consumer. Indirect taxes, such as protective tariffs,

consumption taxes, and the excess-profits tax, though less harmful than currency inflation or loans, and having a less direct effect in increasing the cost of living, nevertheless have an appreciable influence in that direction.

Inevitably, then, Government expenditure increases the cost of living. The function of the Treasury, once the expenditure has been determined upon, is to devise means of meeting it with the least injurious results. What increases the general cost of living imposes an indirect tax on the whole people of the United States which, in the nature of things, bears more heavily upon the poor than upon the rich, and upon the needy than upon the poor, because expenditures for the necessities of life absorb practically the whole income of the poor and needy and a negligible portion of the income of the rich.

Measures for governmental expenditures for the benefit of a portion of the community at the expense of the whole by adding to the cost of living, and to the burden it imposes upon the community as a whole, will only aggravate evils which the sentimental supporters of those measures think to mitigate, and the burdens thus imposed invariably fall most heavily upon those least able to bear them.

I have ventured thus to recall to mind the general principles of economics and finance which underlie the present situation and which so frequently are ignored by the advocates of specific policies and measures that are subversive of sound principles. I discussed the matter somewhat in detail before the House Select Committee on the Budget on October 4, and my statement to that committee is quoted elsewhere in this report under the heading "A Budget System."

It is earnestly urged that the Congress deny every proposal for expenditures in new fields or the continuance or expansion of old unless they represent imperative and unquestioned need. This policy is particularly important in this period, when the solution of the problem of the cost of living is to be found in such large measure in the most rigid economy in public expenditure and in the firm determination to meet that expenditure from current taxes.

TAXATION.

Though any appreciable reduction in the amount of the revenues from taxation is not to be thought of during a fiscal year when the Government's current disbursements will exceed its current receipts, when its unfunded debt amounts to upward of \$3,736,000,000 (October 31, 1919, on the basis of daily Treasury statements), and when the Congress is considering various measures carrying vast additional appropriations, it is, I believe, the duty of the Congress to give its closest attention to the study of the incidence of taxation with a view to the revision of the revenue act on lines which will produce the necessary revenue with the minimum of inconvenience and injustice. The Treasury's objections to the excess-profits tax

even as a war expedient (in contradistinction to a war-profits tax) have been repeatedly voiced before the committees of the Congress. Still more objectionable is the operation of the excess-profits tax in peace times. It encourages wasteful expenditure, puts a premium on overcapitalization and a penalty on brains, energy, and enterprise, discourages new ventures, and confirms old ventures in their monopolies. In many instances it acts as a consumption tax, is added to the cost of production upon which profits are figured in determining prices, and has been, and will, so long as it is maintained upon the statute books, continue to be, a material factor in the increased cost of living.

The revenue sacrificed by elimination or reduction of this tax must be sought in an increase of the normal income tax (from which the income on Liberty bonds is exempt) and of the lower brackets of the surtax. The upmost brackets of the surtax have already passed the point of productivity, and the only consequence of any further increase would be to drive possessors of these great incomes more and more to place their wealth in the billions of dollars of wholly exempt securities heretofore issued and still being issued by States and municipalities, as well as those heretofore issued by the United States. This process not only destroys a source of revenue to the Federal Government, but tends to withdraw the capital of very rich men from the development of new enterprises and place it at the disposal of State and municipal governments upon terms so easy to them (the cost of exemptions from taxation falling more heavily upon the Federal Government) as to stimulate wasteful and nonproductive expenditure by State and municipal governments.

In that connection I call attention to the urgent necessity of revision of the revenue law so as to require that, for the purpose of ascertaining the amount of surtax payable by a taxpayer, his income from State and municipal bonds shall be reported and included in his total income, and the portion of his income which is subject to taxation taxed at the rates specified in the act in respect to a total income of such amount. The Treasury's recommendations in this respect have been transmitted to the appropriate committees of Congress in connection with the Revenue Act of 1918, and again in the present calendar year. Under the present law a person having an income of, say, \$1,000,000 from taxable securities would, upon the sale of half his property and the investment of the proceeds of that half in State or municipal bonds, not only obtain exemption for the income derived from such investment in State and municipal bonds, but greatly reduce the surtaxes payable in respect to his other income. It is intolerable that taxpayers should be allowed, by purchase of exempt securities, not only to obtain exemption with respect to the income derived therefrom, but to reduce the supertaxes upon

their other income, and to have the supertaxes upon their other income determined upon the assumption, contrary to fact, that they are not in possession of income derived from State and municipal bonds.

It is impossible to determine the actual gain in revenue to the Government which would result from such an amendment of the law. That it would be very material I have no doubt. A still more important result of the amendment of the law in this respect, however, would be the reflex benefit to Liberty bonds which carry exemption from normal income tax, but as to the great bulk not from surtaxes. The very great advantage the States and municipalities now have in conferring upon holders of their bonds larger exemptions from Federal taxation than the Federal Government itself confers upon holders of Liberty bonds should be reduced, so far as it may be reduced, by the adoption of appropriate administrative provisions in the Federal revenue law.

A question has been raised concerning the right of the Federal Government under the Constitution to tax the income from State and municipal bonds, but there can be no doubt of the constitutionality of such an administrative provision. The proposal is not to tax the income derived from State and municipal securities, but to prevent evasion of the tax in respect to other income. The principles involved are abundantly established in the decisions of the Supreme Court sustaining taxes upon corporations, bank stock, etc., computed after taking into account income derived from Government, State, and municipal bonds.

I am calling attention to these matters because it is of the utmost importance that the Congress should follow the wise precedent adopted by the last Congress in determining in advance of the year's business the basis upon which taxes are to be imposed. Uncertainty in respect to taxation during any given business period results in each taxpayer's setting aside for taxes an ample margin to cover variations in the tax law which may affect him onerously and calculating his costs and prices on that basis. Even a bad law is better than a retroactive law. It is, therefore, of the utmost importance, in my judgment, that the Congress should give consideration in the calendar year 1920 to the question of revision of the tax law with a view to making such revision effective well in advance in respect to the incomes and profits of the calendar year 1921.

The administration of the Revenue Act of 1918 is discussed later under the heading "Bureau of Internal Revenue."

THE COST OF THE WAR.

The total expenditures of the Government, exclusive of the principal of the public debt and postal disbursements from postal revenues, for the war period from April 6, 1917, to October 31, 1919,

amounted to \$35,413,000,000, according to statistics compiled on the basis of the daily Treasury statements. Of that great total covering the disbursements for two years and seven months, \$11,280,000,000, or nearly 32 per cent, was met out of tax receipts and other revenues than borrowed money, although the amount of taxes does not include the December 15, 1919, installment of income and profits taxes for the fiscal year 1919, nor any part of such taxes for the fiscal year 1920.

The above calculation includes capital outlays as well as expenditures that have been permanently absorbed. No deduction is made for loans to the Allies, or for other investments, such as ships, stock of the War Finance Corporation, bonds of the Federal land banks, etc. Foreign loans on October 31, 1919, aggregated \$9,406,000,000, and if that amount is deducted from the total expenditures, the disbursements for the purposes of the American Government during the war period under consideration were \$26,007,000,000. And on that basis, the proportion met out of tax receipts and revenues other than borrowed money was over 43 per cent.

If it is assumed that the expenses of the Government on a peace basis would have been at the rate of \$1,000,000,000 a year, or \$2,583,000,000 for the two years and seven months mentioned, the estimate of the gross cost of the war to October 31, 1919, would be \$32,830,000,000, inclusive of loans to foreign Governments, or \$23,424,000,000 exclusive of such loans.

The following tables, based on the daily Treasury statements, show the classified disbursements and receipts, exclusive of the principal of the public debt, by months, from April 6, 1917, to October 31, 1919, and the total disbursements and receipts for that period:

Classified disbursements, exclusive of the principal of the public debt, by months, from Apr. 6, 1917, to Oct. 31, 1919, as published in the daily Treasury statements.

	Ordinary.	Foreign loans.	Other special.	Total.
Apr. 6 to 30, 1917.....	\$71,328,006.70	\$200,000,000.00	\$7,885,770.50	\$279,213,777.20
May, 1917.....	114,102,809.68	407,500,000.00	4,962,746.28	526,565,555.96
June, 1917 (revised).....	131,687,849.61	277,500,000.00	919,445.78	410,107,295.39
Total Apr. 6 to June 30, 1917.....	317,118,665.99	885,000,000.00	13,767,962.56	1,215,886,628.55
July, 1917.....	208,299,031.05	452,500,000.00	1,511,814.92	662,310,845.97
August, 1917.....	277,438,000.64	478,000,000.00	2,019,363.50	757,457,364.14
September, 1917.....	349,013,305.34	396,000,000.00	1,364,980.35	746,378,285.69
October, 1917.....	462,045,359.94	480,700,000.00	1,623,392.58	944,368,752.52
November, 1917.....	512,952,035.17	471,929,750.00	1,200,022.36	986,081,807.53
December, 1917.....	611,297,425.62	492,000,000.00	1,914,433.70	1,105,211,859.32
January, 1918.....	715,302,039.83	370,200,000.00	4,854,005.86	1,090,356,045.69
February, 1918.....	675,209,068.43	325,000,000.00	12,477,917.31	1,012,686,985.74
March, 1918.....	819,955,367.26	317,500,000.00	18,338,441.98	1,155,793,809.24
April, 1918.....	910,756,758.95	287,500,000.00	17,031,020.28	1,215,287,779.23
May, 1918.....	1,068,203,026.82	424,000,000.00	15,992,206.83	1,508,195,233.65
June, 1918.....	1,263,914,905.86	242,700,000.00	5,958,796.56	1,512,573,702.42
Total for fiscal year 1918...	7,874,386,324.91	4,738,029,750.00	84,286,396.23	12,696,702,471.14
July, 1918.....	1,259,782,599.23	343,485,000.00	5,015,055.21	1,608,282,654.44
August, 1918.....	1,524,901,777.74	279,250,000.00	1,361,445.28	1,805,513,223.02
September, 1918.....	1,274,505,845.05	282,150,000.00	608,440.22	1,557,264,285.27
October, 1918.....	1,174,622,406.40	489,100,000.00	1,139,854.59	1,664,862,260.99
November, 1918.....	1,655,051,004.19	278,949,697.70	1,248,607.04	1,935,249,308.93

Classified disbursements, exclusive of the principal of the public debt, by months, from Apr. 6, 1917, to Oct. 31, 1919, as published in the daily Treasury statements—Con.

	Ordinary.	Foreign loans.	Other special.	Total.
December, 1918.....	\$1,670,890,396.88	\$389,052,000.00	\$1,033,458.60	\$2,060,975,855.48
January, 1919.....	1,659,580,520.24	290,250,800.00	12,519,629.59	1,962,350,949.83
February, 1919.....	1,035,130,805.19	145,397,302.30	9,385,796.13	1,189,913,903.62
March, 1919.....	1,042,182,523.55	322,350,000.00	15,279,261.96	1,379,811,785.51
April, 1919.....	1,003,862,122.73	409,608,608.27	15,457,575.38	1,428,928,306.38
May, 1919.....	907,492,923.94	194,911,857.29	9,932,690.50	1,112,337,471.73
June, 1919.....	727,845,814.48	54,750,000.00	26,794,135.35	809,389,949.83
Total for fiscal year 1919...	14,935,848,739.62	3,479,255,265.56	99,775,949.85	18,514,879,955.03
July, 1919.....	878,411,103.11	97,650,000.00	212,467.23	976,273,570.34
August, 1919.....	709,827,320.86	54,275,945.99	1,694,477.53	765,797,744.38
September, 1919.....	565,618,231.14	102,006,000.00	1,402,600.90	667,221,630.24
October, 1919.....	524,724,964.06	50,154,927.00	1,469,314.52	576,349,205.58
Total July 1 to Oct. 31, 1919	2,678,581,619.17	304,086,872.99	2,973,658.38	2,985,642,150.54
RECAPITULATION.				
Apr. 6 to June 30, 1917.....	317,118,665.99	885,000,000.00	13,767,962.56	1,215,886,628.55
Fiscal year 1918.....	7,874,386,324.91	4,738,029,750.00	84,286,396.23	12,696,702,471.14
Fiscal year 1919.....	14,935,848,739.62	3,479,255,265.56	99,775,949.85	18,514,879,955.03
July 1 to Oct. 31, 1919.....	2,678,581,619.17	304,086,872.99	2,973,658.38	2,985,642,150.54
Grand total.....	25,805,935,349.69	9,406,371,888.55	200,803,967.02	35,413,111,205.26

¹ Excess of credits.

Classified receipts, exclusive of the principal of the public debt, by months, from Apr. 6, 1917, to Oct. 31, 1919, as published in the daily Treasury statements.

	Customs.	Income and profits tax.	Miscellaneous internal revenue.	Miscellaneous revenue.	Panama Canal.	Total.
Apr. 6 to 30, 1917.....	\$17,863,547.22	\$24,075,386.24	\$35,387,512.86	\$5,804,920.33	\$314,793.31	\$83,446,159.96
May, 1917.....	28,660,148.60	107,601,090.34	50,009,778.45	11,361,950.32	684,421.46	198,267,380.17
June, 1917 (revised).....	18,686,805.14	195,230,281.19	56,993,915.16	14,120,100.17	694,056.30	285,725,157.96
Total Apr. 6, 1917, to June 30, 1917.....	65,210,500.96	326,906,757.77	142,391,206.47	31,289,970.82	1,643,271.07	567,438,707.09
July, 1917.....	15,805,129.91	9,478,880.98	50,895,959.22	7,575,979.09	171,687.08	83,927,636.28
August, 1917.....	15,902,255.99	4,248,091.69	43,922,398.77	8,439,107.31	74,496,570.86	84,467,107.31
September, 1917.....	15,201,388.70	6,026,475.01	41,255,393.95	12,967,317.09	648,787.75	76,109,362.50
October, 1917.....	13,647,946.24	5,937,904.91	50,318,414.27	20,226,866.64	277,153.50	90,468,290.56
November, 1917.....	11,935,386.41	6,720,898.26	81,536,702.42	39,175,571.26	122,200.09	139,490,777.41
December, 1917.....	11,247,214.10	13,725,584.81	61,425,075.62	18,034,077.89	626,508.30	106,039,070.42
January, 1918.....	12,163,216.06	11,428,560.88	61,665,347.95	17,796,189.59	302,895.38	103,356,209.87
February, 1918.....	12,019,441.74	13,200,916.58	59,115,478.32	14,177,234.29	585,348.96	99,048,439.03
March, 1918.....	18,106,373.13	31,424,027.09	89,635,237.66	16,536,309.47	1,047,330.70	136,749,278.05
April, 1918.....	16,445,531.99	83,012,290.95	93,113,711.08	16,111,894.79	378,705.51	200,319,144.26
May, 1918.....	19,925,706.94	342,104,706.75	135,081,920.01	97,254,972.78	655,481.06	594,746,110.99
June, 1918.....	17,598,789.28	1,786,647,885.43	104,032,171.39	22,817,686.62		1,931,772,013.78
Total for fiscal year 1918.....	179,998,383.49	2,314,006,291.84	872,028,020.27	292,513,814.82	6,036,354.28	3,664,582,864.70
July, 1918.....	15,837,889.72	497,496,376.02	10,948,066.11	21,974,810.55	619,994.14	641,877,137.14
August, 1918.....	14,175,902.76	30,795,666.13	83,736,123.70	22,645,000.23	890,439.10	132,232,031.72
September, 1918.....	12,719,024.43	36,308,166.21	80,007,437.44	13,757,134.67	94,331.05	151,884,653.80
October, 1918.....	11,433,066.69	30,136,620.58	93,327,231.04	16,078,975.73	604,815.02	151,580,759.96
November, 1918.....	12,583,861.99	28,820,184.49	99,743,394.89	169,112,403.48	734,419.15	310,994,263.19
December, 1918.....	9,681,907.69	61,916,648.37	117,658,483.35	213,636.93	431,587.99	283,902,264.23
January, 1919.....	12,732,514.84	43,141,373.49	112,287,675.18	27,054,788.82	626,489.31	195,842,841.34
February, 1919.....	14,979,078.02	30,341,342.60	94,310,163.04	27,361,050.46	767,529.81	162,759,163.83
March, 1919.....	17,876,270.46	119,821,269.04	118,240,897.00	31,555,382.12	355,127.60	297,848,946.22
April, 1919.....	20,141,486.97	107,696,034.35	135,039,064.46	139,228,529.43	427,185.33	492,552,210.56
May, 1919.....	20,896,644.65	50,614,139.20	115,265,091.71	92,026,548.47	459,786.63	279,262,210.08
June, 1919.....	21,380,290.27	971,695,866.31	131,919,143.11	56,151,439.19	353,824.88	1,181,500,561.76
Total for fiscal year 1919.....	184,457,867.39	3,018,783,687.29	1,296,501,281.67	646,139,700.05	6,374,590.03	5,152,257,136.43
July, 1919.....	20,498,245.83	44,043,414.30	110,038,601.29	52,821,655.11	379,786.49	227,781,703.02
August, 1919.....	21,033,662.06	28,615,312.08	113,817,065.93	104,727,062.34	325,698.55	268,538,830.96
September, 1919.....	24,724,214.48	944,897,866.34	140,757,151.39	31,852,288.83	824,424.13	1,142,555,445.17
October, 1919.....	24,276,476.04	34,908,495.13	139,333,735.95	58,201,459.39	394,588.72	257,109,755.23
Total July 1, 1919, to Oct. 31, 1919.....	90,552,598.41	1,052,459,587.85	503,946,584.56	247,602,465.67	1,424,497.89	1,895,985,734.33

RECAPITULATION.

Apr. 6, 1917 to June 30, 1917.....	65, 210, 500. 96	326, 906, 757. 77	142, 391, 206. 47	31, 286, 970. 82	1, 643, 271. 07	567, 438, 707. 09
Fiscal year 1918.....	179, 998, 383. 49	2, 314, 006, 291. 84	872, 028, 020. 27	292, 513, 814. 82	6, 036, 354. 28	3, 664, 582, 864. 70
Fiscal year 1919.....	184, 457, 867. 39	3, 018, 783, 687. 29	1, 286, 501, 291. 67	646, 139, 700. 05	6, 374, 590. 03	3, 152, 257, 136. 43
July 1, 1919 to Oct. 31, 1919.....	90, 552, 598. 41	1, 052, 459, 587. 85	503, 946, 384. 36	247, 602, 465. 67	1, 424, 497. 89	1, 895, 985, 734. 38
Grand total.....	520, 219, 350. 25	6, 712, 156, 324. 75	2, 814, 867, 102. 97	1, 217, 542, 951. 36	15, 478, 713. 27	11, 280, 264, 442. 60

Total receipts and disbursements from Apr. 6, 1917, to Oct. 31, 1919, as published in the daily Treasury statements.

RECEIPTS.

Net balance in the general fund Apr. 5, 1917.....	\$92, 317, 710. 27
Receipts, exclusive of principal of public debt, Apr. 6, 1917, to Oct. 31, 1919.....	11, 280, 264, 442. 60
Public debt receipts, Apr. 6, 1917 to Oct. 31, 1919.....	55, 234, 272, 754. 36
	66, 606, 854, 907. 23

DISBURSEMENTS.

Disbursements, exclusive of principal of public debt, Apr. 6, 1917, to Oct. 31, 1919.....	\$35, 413, 111, 205. 26
Public debt disbursements, Apr. 6, 1917 to Oct. 31, 1919.....	30, 305, 711, 180. 75
Net balance in the general fund Oct. 31, 1919.....	888, 032, 521. 22
	66, 606, 854, 907. 23

There is attached a table showing the cash expenditures of the Government for the fiscal years 1917, 1918, and 1919, as published in the daily Treasury statements and classified according to departments.

THE PUBLIC DEBT.

The gross public debt, on the basis of the daily Treasury statements, amounted to \$26,210,530,000 on October 31, 1919, without any deduction for loans to the Allies or other investments. Of this sum, only \$3,736,352,000 was in the form of Treasury certificates or floating debt. The total figures mentioned represented a gross debt increase since April 6, 1917, of \$24,928,561,000. Deducting the net increase in the general fund balance from the gross debt increase results in a net debt increase for the war period from April 6, 1917, to October 31, 1919, of \$24,132,846,000.

The following statement shows the debt classified by issues and the gross and net increase for the war period:

Public debt Oct. 31, 1919, on the basis of the daily Treasury statements.

Bonds:

Consols of 1930	\$599,724,050.00	
Loan of 1925.....	118,489,900.00	
Panama's of 1916-1936.....	48,954,180.00	
Panama's of 1918-1938.....	25,947,400.00	
Panama's of 1961.....	50,000,000.00	
Conversion bonds.....	28,894,500.00	
Postal savings bonds.....	11,453,100.00	
		\$883,463,130.00
First Liberty loan	1,984,783,330.00	
Second Liberty loan	3,526,377,747.60	
Third Liberty loan.....	3,904,313,017.50	
Fourth Liberty loan	6,613,907,148.00	
		16,029,381,243.10
Total bonds		16,912,844,373.10
Notes: Victory Liberty loan		4,413,933,116.53
Treasury certificates:		
Loan and tax.....	3,465,136,000.00	
Pittman Act.....	255,475,000.00	
Special issues.....	15,741,300.37	
		3,736,352,300.37
War-savings certificates (net cash receipts).....		910,684,987.44
Old debt on which interest has ceased.....		2,144,970.26
Total interest-bearing debt		25,975,959,747.70
Noninterest-bearing debt.....		234,570,522.19
Total gross debt.....		26,210,530,269.89

Gross and net increase of the public debt for the war period, Apr. 6, 1917, to Oct. 31, 1919, on the basis of the daily Treasury statements.

Total disbursements for war period, exclusive of principal of public debt.....	\$35,413,111,205.26	Total gross debt Oct. 31, 1919....	\$26,210,530,269.89
Total receipts for war period, exclusive of principal of public debt.....	11,280,264,442.60	Total gross debt Apr. 5, 1917....	1,281,968,696.28
		Gross debt increase for war period.....	24,928,561,573.61
		Net balance in the general fund Oct. 31, 1919.....	\$888,032,521.22
		Net balance in the general fund Apr. 5, 1917.....	92,317,710.27
		Net increase in balance in general fund.....	795,714,810.95
Excess of disbursements over receipts for war period.....	24,132,846,762.66	Net debt increase for war period.....	24,132,846,762.66

There is attached hereto the financial statement of the United States Government as of June 30, 1919, which shows the state of the Treasury and of the public debt on that date.

THE FOURTH LIBERTY LOAN.

The annual report of the Secretary of the Treasury for the fiscal year 1918 reported the approximate final results with respect to subscriptions to the fourth Liberty loan. It was necessary subsequently to make several adjustments in the compilation. The figures, corrected to September 30, 1919, show that the total amount of subscriptions allotted was \$6,992,927,100. The amount of bonds issued and deliverable as a result of these subscriptions was \$6,964,524,650. This was the largest of the Liberty loans and was the greatest issue of bonds in history. It is estimated that the vast amount allotted was subscribed by 22,777,680 persons. Eighty-four per cent of that number subscribed in amounts of \$50 and \$100, while more than 99 per cent subscribed in amounts ranging from \$50 to \$10,000. The following table shows the subscriptions allotted, payments received, and original deliveries of coupon and registered bonds as of September 30, 1919:

The fourth Liberty loan—Statement of subscriptions allotted, payments received, and original delivery of coupon and registered bonds as of Sept. 30, 1919.

	Boston.	New York.	Philadel- phia.	Cleveland.	Richmond.
Subscriptions allotted.....	\$632,101,250	\$2,044,901,750	\$598,763,650	\$701,909,800	\$352,685,200
Payments received by Treasurer of United States.....	632,101,250	2,044,901,750	598,763,650	701,909,800	352,685,200
Less part payments.....					
Full-paid subscriptions.....	632,101,250	2,044,901,750	598,763,650	701,909,800	352,685,200
Original delivery—Coupon bonds....	574,977,450	1,889,516,600	577,866,400	636,847,700	316,264,000
Original delivery—Registered bonds..	57,123,800	155,385,150	20,897,250	65,062,100	36,421,200
Original delivery—Total.....	632,101,250	2,044,901,750	598,763,650	701,909,800	352,685,200
Deliverable against full-paid sub- scriptions.....					

The fourth Liberty loan—Statement of subscriptions allotted, payments received, and original delivery of coupon and registered bonds as of Sept. 30, 1919—Continued.

	Atlanta.	Chicago.	St. Louis.	Minneapolis.
Subscriptions allotted.....	\$217,885,200	\$969,209,000	\$295,340,250	\$242,046,050
Payments received by Treasurer of United States.....	217,816,808	969,209,000	295,340,250	242,046,050
Less part payments.....	12,308	.....	.....	.....
Full-paid subscriptions.....	217,804,500	969,209,000	295,340,250	242,046,050
Original delivery—Coupon bonds.....	195,244,050	840,150,950	253,415,200	209,367,350
Original delivery—Registered bonds.....	22,508,450	129,058,050	41,925,050	32,678,700
Original delivery—Total.....	217,752,500	969,209,000	295,340,250	242,046,050
Deliverable against full-paid subscriptions.....	52,000	.....	.....	.....

	Kansas City.	Dallas.	San Francisco.	Special.	Total.
Subscriptions allotted.....	\$295,951,450	\$145,997,950	\$462,250,000	\$33,885,550	\$9,992,927,100
Payments received by Treasurer of the United States.....	295,949,750	145,978,405	462,242,190	5,596,950	6,964,541,053
Less part payments.....	200	2,905	990	.....	16,403
Full-paid subscriptions.....	295,949,550	145,975,500	462,241,200	5,596,950	6,964,524,650
Original delivery—Coupon bonds.....	219,445,750	132,719,800	436,417,400	5,594,750	6,287,827,400
Original delivery—Registered bonds.....	76,475,100	13,255,700	25,823,750	2,200	676,616,500
Original delivery—Total.....	295,920,850	145,975,500	462,241,150	5,596,950	6,964,443,900
Deliverable against full-paid subscriptions.....	28,700	.....	50	.....	80,750

The statistical information with respect to results of the fourth Liberty loan, attached hereto, was compiled by the War Loan Organization and is based upon the subscriptions as originally reported. Since that time there have been various adjustments in the figures, particularly with respect to Army subscriptions, which, under the special plan, were subject to cancellation in certain circumstances. The final allotment and issue, corrected to September 30, 1919, is in accordance with the above table.

THE VICTORY LIBERTY LOAN.

Early in the calendar year 1919 it became clear that it would be necessary, as predicted in November, to issue another loan in the spring to fund the floating debt, which was rapidly accumulating as the result of mounting expenditures in the months immediately succeeding the signing of the armistice. The situation was one of very great and very grave difficulty with respect to the successful continuation of the Government's program of war finance. The country was passing through the period of readjustment from the most colossal organization for war in our history to the normal processes of peace. This transition naturally was to be accomplished through gradual stages and inevitably was to be marked by uncertainties and perplexities that affected the whole structure of industry,

business, and finance. In addition, the cessation of hostilities, with the knowledge that the terms of the armistice made it impossible for Germany to resume fighting, caused many people hastily to assume that the large financial requirements of the Government were at an end. There could be no greater error, or even calamity if the impression were not quickly eradicated. The patriotism of war had made memorable successes of four great Liberty loans, but all of the war bills had not been paid. The fifth loan, to be floated without the accompaniment of the enthusiasm and delirium of war and the presence of imminent danger in the face of a national enemy, was to test the quality of the patriotism of peace of the people of America.

In the face of these unfavorable conditions, the Treasury was told by men of steady judgment that we must approach the problem of the fifth loan in a distinctly cold-blooded mood; that things had assumed a different aspect; that our attitude of mind and heart was altered; that we must consider the matter strictly from an investment point of view and put the loan on a commercial basis. Some students of the situation believed it would be impossible again to appeal to the patriotism of the American people. The Treasury held no such view. Furthermore, it was impossible to float the loan strictly on a commercial basis. After floating billions of dollars of Liberty bonds, it was unthinkable to expect the assimilation, purely for investment purposes, of a loan of the proportions required. This department recognized that an appeal must be made to the patriotism of Americans, and its unflinching faith in the result of that appeal was never shaken. The honor of the Government was involved in the payment of the war bills; and the Government's honor is the people's honor. To have lost confidence in the loyalty of the fathers and mothers, brothers and sisters, and compatriots of the fine men who went to France to save the freedom of the world would have brought despair into the Treasury, and despair in the Treasury, of all places, would have meant the failure of the loan.

It was the desire of the department to postpone the offering of the issue, which it was decided to name the Victory Liberty loan in honor of the heroic achievements of our gallant Army and Navy and the successful conclusion of the war, until the latest possible date in order to give the country time to recover from the tremendous transactions involved in the fourth Liberty loan, to permit the progress of readjustment to the utmost limit, and to afford the largest measure of preparation for the issue to be floated under such unusual and untried conditions. In the circumstances, it was out of the question to determine in detail all the terms and conditions of the loan before the third session of the Sixty-fifth Congress expired by constitutional limitation on March 4, 1919, and, consequently,

it was necessary to ask the Congress for larger discretion than had hitherto been granted, if the Government was to obtain all the advantages accruing from the ability to fix the rate of interest and other terms of the loan at an opportune and appropriate time in order to meet conditions as they might exist when the offering was made to the public.

While the Congress did not grant in full the authority requested by the Treasury, it responded, through the Victory Liberty loan act, approved March 3, 1919, with a law that entrusted sufficient power and discretion to the Secretary of the Treasury with respect to the fifth loan to enable him to deal with the situation as it might develop. The new statute authorized the issue of notes of the United States to the extent of not over \$7,000,000,000 upon such terms and conditions and at such rate or rates of interest as the Secretary might prescribe. It was provided that the maturities should be not less than one year nor more than five years from the date of issue. The act included certain alternative proposals with respect to exemptions from taxation and the Secretary was given discretion to choose from among four classes of exemptions. The right to fix the rate of interest and the latitude given with regard to exemptions from taxation permitted the Treasury to wait until the very eve of the loan campaign, if necessary, before naming the terms and conditions of the issue. For the purpose of stabilizing the market for the 4 per cent and 4½ per cent Liberty bonds, the law provided additional exemptions from taxation for the outstanding issues.

During the war, Secretary McAdoo had very wisely issued long-term bonds with maturities and redemption dates spread over the period from 1927 to 1947, leaving the field for short-term securities free, with the exception of war-savings certificates and the temporary certificates of indebtedness, for use in meeting the situation that followed the period of active fighting. After a careful survey of financial conditions in all parts of the country, it was decided to take advantage of the favorable field for short-term securities and exercise the authority conferred by the Victory Liberty loan act for the issue of short-term notes rather than long-term bonds, which latter, under the law, were limited as to rate of interest to 4½ per cent per annum and were subject, with an unimportant exception, to super-taxes and profits taxes. As soon as this conclusion was definitely reached the people of the country were promptly advised. The first public announcement was made on March 12, 1919, when it was stated that the notes would be sold as a popular issue by means of another great intensive campaign which would open on Monday, April 21, and close on Saturday, May 10. It was not possible, that far in advance of the opening of the campaign, to determine the rate of

interest or the exemptions from taxation which the notes would enjoy because those questions must be based on conditions existing immediately prior to the public offering.

During the weeks immediately preceding the campaign there still remained a small minority among the people, including men of influence in public life, who looked pessimistically upon the outlook for the success of the loan. Senator Calder aptly expressed this feeling in a letter which he wrote to the Secretary on March 27, 1919, drawing the department's attention to the decline in the market prices of Liberty bonds and urging the calling of an extra session of the Congress to pass remedial legislation to prevent the failure of the Victory loan. The Treasury did not in any sense share such gloomy forebodings.

The above exposition of the situation was heartily indorsed by the members of the War Loan Organization, whose views coincided with those of the Treasury and were guided by an abiding faith in the patriotism of the American people and their willingness and ability to do whatever was necessary in the circumstances to pay the bills of the war.

With all plans completed for the campaign, it was found possible to decide the terms and conditions of the loan on April 14, 1919, when the information was immediately given to the country. The formal offering of the issue was made in Department Circular No. 138, dated April 21, 1919, attached hereto. The form of application for the notes by subscribers generally, and the form of application by incorporated banks or trust companies for coupon notes for advance delivery, are attached hereto. The public announcement of April 14, summarizing the terms and conditions of the loan, was as follows:

The Victory Liberty loan, which will be offered for popular subscription on April 21, will take the form of $4\frac{1}{4}$ per cent three-four year convertible gold notes of the United States, exempt from State and local taxes, except estate and inheritance taxes, and from normal Federal income taxes. The notes will be convertible, at the option of the holder, throughout their life into $3\frac{1}{4}$ per cent three-four year convertible gold notes of the United States, exempt from all Federal, State, and local taxes, except estate and inheritance taxes. In like manner the $3\frac{1}{4}$ per cent notes will be convertible into the $4\frac{1}{4}$ per cent notes.

The amount of the issue will be \$4,500,000,000, which, with the deferred installments of income and profits taxes payable, in respect to last year's income and profits, during the period covered by the maturity dates of Treasury certificates of indebtedness now outstanding, will fully provide for the retirement of such certificates. The issue will be limited to \$4,500,000,000 except as it may be necessary to increase or decrease the amount to facilitate allotment. Oversubscriptions will be rejected and allotments made on a graduated scale similar in its general plan to that adopted in connection with the first Liberty loan. Allotment will be made in full on subscriptions up to and including \$10,000.

The notes of both series will be dated and bear interest from May 20, 1919, and will mature on May 20, 1923. Interest will be payable on December 15, 1919, and there-

after semiannually on June 15 and December 15, and at maturity. All or any of the notes may be redeemed before maturity at the option of the United States on June 15 or December 15, 1922, at par and accrued interest.

In fixing the terms of the issue, the Treasury has been guided largely by the desire to devise a security which will not only prove attractive to the people of the country in the first instance, but the terms of which should insure a good market for the notes after the campaign is over and identical prices for the two series, and should not affect injuriously the market for the existing bonds of the Liberty loans.

This will be the last Liberty loan. Although as the remaining war bills are presented further borrowing must be done, I anticipate that the requirements of the Government, in excess of the amount of taxes and other income can, in view of the decreasing scale of expenditure, be readily financed by the issue of Treasury certificates from time to time as heretofore, which may be ultimately refunded by the issue of notes or bonds without the aid of another great popular campaign such as has characterized the Liberty loans.

I am sure that the people of America will subscribe to this Victory loan in the same spirit of patriotism which they have shown in the past to the end that the notes may be as widely distributed as possible, and that our banking institutions may be left free to supply the credit necessary for the purpose of industry and commerce and the full employment of labor. Let the world see that the patriots of America, out of their boundless resources, and with the same enthusiasm and devotion to country with which they prosecuted the war to a victorious conclusion, are determined to finish the job.

Probably as a result of the certificate program, the country had acquired the impression that the loan would amount to \$5,000,000,000 or \$6,000,000,000, and the announcement that \$4,500,000,000 would be sufficient for the issue had a beneficial effect. In fixing the amount of the loan, the Treasury exercised its best judgment as to the sum which, having regard to the huge tax receipts which were being collected during the year, and the huge amounts of Liberty bonds so recently issued, it believed could be well absorbed. It was decided to reject any oversubscription of the issue, because the offering of an unlimited amount of the notes undoubtedly would have decreased any buying power, or eliminated the possibility of any buying power, after the loan was over and in effect would have curtailed the subscriptions. After the first loan and during the time of hostilities, with an unknown war period before us and unknown liabilities growing out of the war afterwards, the Treasury was bound to take all or substantially all the subscriptions it could get. Unquestionably that was a wise course during the period of the war. Now that hostilities were over and we knew approximately the dimensions of the Government's problem, it was believed that the closed issue would better serve the purpose.

One of the principal difficulties that confronted the department at the opening of the campaign and in the months immediately preceding was a certain apathy among the people owing to a lack of understanding of the financial needs of the Government. It was necessary for the Treasury and the Liberty loan committees to undertake an extensive campaign to inform the public that while the guns had ceased to fire, the war bills were still being received and many

obligations of the Government yet remained to be satisfied. The Secretary made a tour of the country for the purpose of arousing the interest of the people and advising them of the requirements of the Treasury. He visited and made public speeches in the following cities: Pittsburgh, Pa.; Minneapolis, Minn.; St. Paul, Minn.; Chicago, Ill.; Baltimore, Md.; Richmond, Va.; Norfolk, Va.; New York City; Cleveland, Ohio; Cincinnati, Ohio; Louisville, Ky.; Indianapolis, Ind.; Omaha, Nebr.; Denver, Colo.; Hutchinson, Kans.; Oklahoma City, Okla.; St. Louis, Mo.; Atlanta, Ga.; Charleston, S. C.; Philadelphia, Pa.; Boston, Mass.; and Providence, R. I.

The campaign for the loan found its expression and echo in every city, town, hamlet, and rural district of the country. The Treasury felt that all that was needed to assure the subscription of the notes was to reach the people with full and reliable information as to the Government's necessities. That faith was fully sustained by the result.

Like all previous issues, the loan was a great success, amply rewarding all the preparation and all the laborious work of the War Loan Organization and justifying the confident expectation of the Government and its steady trust in the loyalty of Americans and their capacity to accomplish the seemingly impossible. The patriotism of peace proved to be as great and as self-sacrificing as the patriotism of war. The Victory loan was more than a victory; it was a thanksgiving. The result was a significant achievement in the face of dire predictions and was a further manifestation of the solidarity of the people and their love of the United States.

The total subscriptions, which were widely distributed among the people, amounted to \$5,249,908,300—an oversubscription of \$749,908,300, or 16.66 per cent. In accordance with the terms of the issue the oversubscription was rejected, and subscriptions allotted to the amount of \$4,500,000,000, which has been since slightly reduced as the result of adjustments and cancellations of Army and Navy subscriptions. The amount of subscriptions allotted, corrected to September 30, 1919, was \$4,498,312,650.

Allotment of subscriptions was made on the following basis:

Class of subscriptions.	Per cent allotted.
A and B, up to and including \$50,000.....	100 per cent.
C and D, over \$50,000 and up to and including \$200,000.....	80 per cent but not less than \$50,000 notes.
E, as follows:	
Over \$200,000 and up to and including \$500,000.....	70 per cent but not less than \$160,000 notes.
Over \$500,000 and up to and including \$2,500,000.....	60 per cent but not less than \$350,000 notes.
Over \$2,500,000 and up to and including \$15,000,000.....	50 per cent but not less than \$1,500,000 notes.
Over \$15,000,000 and up to but not including \$30,000,000.....	45 per cent but not less than \$7,500,000 notes.
\$30,000,000 and up to but not including \$50,000,000.....	42.4 per cent.
\$50,000,000.....	42.39 plus per cent—(\$21,196,600 notes).

In order to facilitate the gradual payment for subscriptions and accommodate the convenience of investors in the notes as far as possible, subscribers were permitted to make payment on the following installment plan, stretching over the six months' period from May 10, 1919, to November 11, 1919:

10 per cent with application on or before May 10.

10 per cent on July 15.

20 per cent on August 12.

20 per cent on September 9.

20 per cent on October 7.

20 per cent on November 11, with accrued interest on deferred installments.

Payment in full could be made with application or on May 20 (except as to subscriptions subject to allotment, in which case payment might be completed on June 3) provided the 10 per cent required with application had been duly paid on or before May 10. It was also permissible to complete payment on any installment date with accrued interest.

The subjoined table shows the subscriptions allotted, payments received, and original deliveries of registered and coupon notes as of September 30, 1919:

Statement of subscriptions allotted, payments received, and original deliveries of registered and coupon notes of the 4½ per cent and 3½ per cent Victory Liberty loan as of Sept. 30, 1919.

	Boston.	New York.	Philadelphia.	Cleveland.	Richmond.
Subscriptions allotted (corrected to Sept. 30, 1919).....	\$371,910,150.00	\$1,318,041,150.00	\$376,290,100.00	\$443,802,250.00	\$210,889,300.00
Payments received by Treasurer United States	349,784,050.00	1,276,177,120.00	363,527,915.00	426,552,970.00	194,508,750.00
Less part payments.....	33,189,150.00	62,696,520.00	17,755,265.00	25,873,920.00	24,459,150.00
Full paid subscrip- tions.....	316,594,900.00	1,213,480,600.00	345,772,650.00	400,679,050.00	170,049,600.00
Original delivery:					
4½ per cent coupon notes.....	238,248,150.00	755,379,950.00	278,048,050.00	316,764,750.00	141,583,500.00
4½ per cent registered notes.....	28,100,150.00	77,506,100.00	16,124,250.00	42,593,500.00	18,962,400.00
Total 4½ per cent notes.....	266,348,300.00	832,886,050.00	294,172,300.00	359,358,250.00	160,545,900.00
Original delivery:					
3½ per cent coupon notes.....	42,741,450.00	362,998,500.00	45,742,600.00	31,725,550.00	9,153,150.00
3½ per cent registered notes.....	3,430,700.00	6,247,500.00	1,016,300.00	2,580,850.00	332,050.00
Total 3½ per cent notes.....	46,172,150.00	369,246,000.00	46,758,900.00	34,306,400.00	9,485,200.00
Grand total, origi- nal deliveries.....	312,520,450.00	1,202,132,050.00	340,931,200.00	393,664,650.00	170,031,100.00
Victory Liberty loan notes deliverable.....	4,074,450.00	11,348,550.00	4,841,450.00	7,014,400.00	18,500.00

Statement of subscriptions allotted, payments received, and original deliveries of registered and coupon notes of the 4½ per cent and 3½ per cent Victory Liberty loan as of Sept. 30, 1919—Continued.

	Atlanta.	Chicago.	St. Louis.	Minneapolis.
Subscriptions allotted (corrected to Sept. 30, 1919).....	\$133,080,800.00	\$694,330,000.00	\$201,787,600.00	\$170,076,650.00
Payments received by Treasurer United States.....	125,860,424.50	659,130,130.00	197,009,530.00	154,687,159.07
Less part payments.....	10,538,724.50	52,770,030.00	7,153,230.00	22,583,859.07
Full paid subscriptions.....	115,321,700.00	606,360,100.00	189,856,300.00	132,103,300.00
Original delivery:				
4½ per cent coupon notes.....	92,920,400.00	454,313,350.00	148,700,500.00	100,590,700.00
3½ per cent registered notes.....	10,706,450.00	87,904,500.00	36,046,050.00	24,124,850.00
Total 4½ per cent notes.....	103,626,850.00	542,217,850.00	184,746,550.00	124,715,550.00
Original delivery:				
3½ per cent coupon notes.....	5,615,900.00	56,573,950.00	4,450,000.00	4,428,750.00
3½ per cent registered notes.....	896,900.00	6,059,600.00	544,900.00	1,251,650.00
Total 3½ per cent notes.....	6,512,800.00	62,633,550.00	4,994,900.00	5,680,400.00
Grand total, original deliveries.....	110,139,650.00	604,851,400.00	189,741,450.00	130,395,950.00
Victory Liberty loan notes deliverable.....	5,182,050.00	1,508,700.00	114,850.00	1,707,350.00

	Kansas City.	Dallas.	San Francisco.	Special Treasury allotment.	Total.
Subscriptions allotted (corrected to Sept. 30, 1919)....	\$192,429,300.00	\$84,002,500.00	\$294,905,050.00	\$6,767,800.00	\$4,498,312,650.00
Payments received by Treasurer United States.....	179,258,250.00	74,254,590.00	275,351,397.50	1,835,850.00	4,277,938,136.07
Less part payments.....	19,080,550.00	14,483,240.00	29,290,297.50	.....	319,873,936.07
Full paid subscriptions.....	160,177,700.00	59,771,350.00	246,061,100.00	1,835,850.00	3,958,064,200.00
Original delivery:					
4½ per cent coupon notes.....	103,879,450.00	48,216,600.00	215,989,350.00	1,835,850.00	2,896,470,600.00
4½ per cent registered notes.....	42,212,400.00	5,252,000.00	14,258,000.00	.....	403,790,650.00
Total 4½ per cent notes.....	146,091,850.00	53,468,600.00	230,247,350.00	1,835,850.00	3,300,261,250.00
Original delivery:					
3½ per cent coupon notes.....	7,128,650.00	2,862,300.00	14,352,450.00	.....	587,773,250.00
3½ per cent registered notes.....	1,798,950.00	710,400.00	649,800.00	.....	25,519,600.00
Total 3½ per cent notes.....	8,927,600.00	3,572,700.00	15,002,250.00	.....	613,292,850.00
Grand total, original deliveries.....	155,019,450.00	57,041,300.00	245,249,600.00	1,835,850.00	3,913,554,100.00
Victory Liberty loan notes deliverable.....	5,158,250.00	2,730,050.00	811,500.00	.....	44,510,100.00

¹ Includes adjustment Oct. 1, 1919.

NOTE.—Payments as shown by Treasurer United States. Full-paid subscriptions and coupon notes delivered as shown by monthly statement of Federal reserve banks. Registered notes delivered as shown by records of Secretary's office, Division of Loans and Currency.

There are attached hereto various tables showing the results of the Victory loan. These were compiled by the War Loan Organization and are based upon the subscriptions as originally reported. Since that time there have been various adjustments in the figures, particularly in connection with Army and Navy subscriptions, which under the special plan, were subject to cancellation in certain cir-

cumstances. The final allotment and deliveries upon original issue, corrected to September 30, 1919, are in accordance with the above table.

TREASURY CERTIFICATES OF INDEBTEDNESS.

Every issue of Treasury certificates of indebtedness from the beginning of the war to date has been a success. This means of temporary financing has provided the Government with funds in advance of receipts from the sales of bonds or notes or in anticipation of revenue from income and profits taxes, and has served the additional helpful purpose of distributing the payments of bond and note subscriptions and of taxes gradually over extended periods of time, avoiding tremendous transfers of funds on any one date and consequent money stringency.

The execution of the certificate and Liberty loan program was made possible by the creation of a great system of depository banks, referred to more in detail elsewhere in this report under the heading "Public Moneys and Special Depositories." Bank deposits in America are distributed among some 36,000 banks and trust companies scattered throughout the country. By the designation of nearly 10,000 banks and trust companies as special depositories of the Government and the sale to them and to many others of certificates of indebtedness, the Treasury tapped the whole credit resources of the people and made them available to the Government for the winning of the war in the intervals between the great Liberty loans and in anticipation of income and profits taxes. Through the development of this plan, banks and trust companies are having increasing success in the distribution of the securities to their customers.

The issues of certificates have fallen into three general classes, (1) those issued in anticipation of loans, (2) those issued in anticipation of income and profits taxes, and (3) special issues. The special issues may be subdivided into three groups, (a) those issued under the Pittman Act, (b) issues payable in foreign currency and discussed elsewhere in this report under the heading "Loans to Foreign Governments," and (c) special issues of very short maturity for temporary purposes.

The aggregate amount of all issues since the beginning of the war to October 31, 1919, was \$32,706,964,903.34. Of that sum \$18,657,988,000 was placed with the public in anticipation of sales of bonds and notes, \$6,060,866,000 in anticipation of tax payments, and \$7,988,110,903.34 comprised the special issues. The amount outstanding on October 31, 1919, aggregated \$3,736,352,300.37, consisting, as shown by the following table, of \$1,827,586,500 tax certificates, \$1,634,671,000 loan certificates, \$255,475,000 issues under the Pittman Act, \$15,741,300.37 other special issues, and \$2,878,500 matured certificates on which interest has ceased:

Statement of Treasury certificates outstanding Oct. 31, 1919.

Tax certificates:

Series T-5 dated June 3, 1919, due Dec. 15, 1919	\$236,760,500.00
Series T-7 dated July 1, 1919, due Dec. 15, 1919.....	510,109,000.00
Total tax certificates due Dec. 15, 1919.....	746,869,500.00
Series T-8 dated July 15, 1919, due Mar. 15, 1920.....	322,116,500.00
Series T-9 dated Sept. 15, 1919, due Mar. 15, 1920.....	101,131,500.00
Total tax certificates due Mar. 15, 1920.....	423,248,000.00
Series T-10 dated Sept. 15, 1919, due Sept. 15, 1920.....	657,469,000.00

Loan certificates:

Series A-1920 dated Aug. 1, 1919, due Jan. 2, 1920.....	\$532,024,500.00
Series B-1920 dated Aug. 15, 1919, due Jan. 15, 1920.....	530,329,000.00
Series C-1920 dated Sept. 2, 1919, due Feb. 2, 1920.....	572,317,500.00
Total loan certificates series 1920.....	1,634,671,000.00

RECAPITULATION.

Tax certificates due Dec. 15, 1919.....	\$746,869,500.00
Tax certificates due Mar. 15, 1920.....	423,248,000.00
Tax certificates due Sept. 15, 1920.....	657,469,000.00
Total tax certificates.....	1,827,586,500.00
Loan certificates due Jan. 2, Jan. 15, and Feb. 2, 1920.....	1,634,671,000.00
Total tax and loan certificates.....	3,462,257,500.00
Pittman Act certificates.....	255,475,000.00
Other special certificates.....	15,741,300.37
Matured certificates on which interest has ceased.....	2,878,500.00
Total outstanding Oct. 31, 1919.....	3,736,352,300.37

The certificate program subsequent to the Victory Liberty loan is discussed in the beginning of this report. In anticipation of that loan there were 10 issues of certificates offered in the main at fortnightly intervals over the period from December 5, 1918, to May 1, 1919.

The maturity of each issue in anticipation of the Victory loan was five months (except series V K, where the maturity exceeded five months by only one week) and the rate of interest was 4½ per cent. The aggregate amount issued was \$6,157,589,500, which has all been retired from Victory note subscriptions, cash in bank, or refunding operations. Some of the issues were called for redemption in advance of maturity and in other cases, when possible, offers were made to redeem the certificates in advance of maturity at the option of the holders. To the extent that such calls were made or such offers accepted, the retirement of the certificates was facilitated, and the expense of interest charges to the Government was saved. This policy has been consistently pursued whenever the position of the Treasury would permit.

Including two issues mentioned in the previous annual report of the Secretary of the Treasury, there were eight issues of certificates,

aggregating \$3,354,787,500, in anticipation of income and profits taxes payable in the calendar year 1919. There have been three issues, aggregating \$1,081,675,000, in anticipation of income and profits taxes payable in the calendar year 1920. The first issue on August 20, 1918, in anticipation of 1919 taxes, bore interest at the rate of 4 per cent. All succeeding issues were at the rate of $4\frac{1}{2}$ per cent until September 15, 1919, when the rate for the series maturing in six months, series T 9, was reduced to $4\frac{1}{4}$ per cent. The maturities of all the outstanding issues of tax certificates coincide with the dates for the payments of income and profits taxes. The outstanding issues mature on December 15, 1919, March 15, 1920, and September 15, 1920. December 15, 1919, is the date for the payment of the fourth installment of income and profits taxes for the year 1919. March 15 and September 15, 1920, are the first and third installment dates for the payment of income and profits taxes for the year 1920.

In offering tax certificates to the public, every possible effort has been made to advise taxpayers of their availability. About the middle of January, 1919, in advance of the passage of the revenue act approved February 24, 1919, and when it was uncertain what installment dates for the payment of income and profits taxes would ultimately be carried in the new law, the Treasury offered an issue of certificates with sufficient elasticity as to the date when they would be receivable in payment of such taxes to cover any possible changes in the bill as it was then pending in the Congress.

Wide publicity has been given to all offers of tax certificates from time to time, in order that taxpayers might patriotically assist the financial operations of the Government and at the same time serve their own convenience by saving in anticipation of their taxes by means of a wise investment, assuring a liberal return. Similar efforts to obtain the largest possible distribution among investors of loan certificates have been made in respect to all the issues subsequent to the Victory loan. The success of these efforts for the distribution of loan and tax certificates appears from the fact that of \$3,465,136,000 of loan and tax certificates outstanding on October 31 the Federal Reserve Board's reports show that the holdings of all reporting member banks as of November 7, 1919, amounted to only \$847,558,000. From the fact that on the average 80.5 per cent of the subscriptions for certificates are made by qualified depositaries and that on the average 79 per cent of the Government deposits during the period of the offerings were held by the banks included in these reports to the Federal Reserve Board, the Treasury estimates that 63.5 per cent of the certificates outstanding, or \$2,200,361,360, were originally subscribed for by all reporting member banks, and that therefore they have distributed among investors about 62 per cent of the certificates originally subscribed for by them.

A table showing in detail all the issues of certificates of indebtedness, from the beginning of the war to October 31, 1919, is attached hereto as Exhibit 12, page 258. Public announcements of the various offerings of certificates of indebtedness in anticipation of loans and taxes, together with calls for redemption before maturity, and offers to redeem at the option of the holders, which have been issued since the previous annual report of the Secretary of the Treasury, are likewise attached as Exhibits 13 to 41, pages 266 to 290.

WAR-SAVINGS CERTIFICATES.

Sales of war-savings stamps and certificates and thrift stamps have proceeded throughout the year, and the Treasury plans the continuation of this wholesome movement with unabated vigor in the interest of savings and investment in Government securities. The campaign was conducted in the calendar year 1919 under an organization remodeled according to the plan evolved in the latter part of 1918 and described in the previous report of the Secretary of the Treasury. The work in the field has been in charge of organizations for each of the several Federal reserve districts under the direction and supervision of the governors of the respective Federal reserve banks. Each governor appointed a district director. In some districts a "director of war-loan organization" was appointed in charge of all war-loan activities, including those relating to the war-savings securities, but in other districts a separate "director of savings" was designated. At the beginning of the calendar year 1919, a savings division was created in the Treasury in charge of a director of savings. This division is part of the Treasury's War Loan Organization and is under the general supervision of the Treasury director of War Loan Organization. The governors of the Federal reserve banks are responsible for the conduct of the savings movement in their respective districts, and the work is carried on under plans adapted to the special needs of the particular districts, subject to general principles outlined by the Secretary of the Treasury. The Treasury savings division initiates or executes the work of a general or national character, coordinates the activities in the districts, and acts as a service bureau, furnishing the district organizations with suggestions and material for local use.

No change was made in 1919 in the thrift stamps used in 1918, the stamps being undated and non-interest-bearing securities. The 1919 war savings stamps and certificates are identical in terms with the stamps and certificates of the 1918 issue, except for the fact that they mature on January 1, 1924, instead of January 1, 1923. The form, however, was changed. The 1919 stamps are smaller in size, blue in color, and bear the portrait head of Benjamin Franklin. The terms

of the issue appear in Department Circular No. 128, dated December 18, 1918, attached hereto.

In order to meet the demand for war-savings securities in single denominations larger than \$5, the Treasury, in July, 1919, announced the issue of war-savings certificates of two additional denominations, one of \$100 and the other of \$1,000, maturity value. These certificates, which for convenience were described as "Treasury savings certificates," are a part of the 1919 series of war-savings certificates and are subject to the provision of the authorizing act that it is not lawful for any one person at any one time to hold war-savings certificates of any one series (of whatever issue or denomination) to an aggregate amount exceeding \$1,000, maturity value. The Treasury savings certificates are war-savings certificates of larger denominations, and they have corresponding terms as to increasing sales and redemption values each month and the same period of maturity. The certificates are all registered, by means of detachable registration stubs, and the registration records are kept in the Treasury rather than in the post offices. It was also provided that the redemption should be made by the Treasury direct rather than through the post offices. Like other war-savings certificates, these certificates may be redeemed prior to maturity, but they differ in that they can not be redeemed before the second calendar month following the month in which they were purchased. Treasury Department Circulars Nos. 143 and 149, dated July 1, 1919, and July 31, 1919, respectively, attached hereto as Exhibits 43 and 44, pages 295 and 302, describe the new certificates in detail and prescribe the terms and conditions governing their issue and redemption and the rights of their holders. The sales of these certificates up to the present indicate that they meet a real demand.

The cash receipts from the sale of thrift and war savings stamps and Treasury savings certificates, using the figures in the daily Treasury statements for the last day of each month, from the first month of their issue to October 31, 1919, have been as follows:

1917—December.....	\$10,236,451.32
1918—January.....	24,559,722.15
February.....	41,148,244.22
March.....	53,967,864.49
April.....	60,972,984.12
May.....	57,956,640.12
June.....	58,250,485.00
July.....	211,417,942.61
August.....	129,044,200.62
September.....	97,614,581.48
October.....	89,084,097.31
November.....	73,689,846.00
December.....	63,970,813.47
	\$971,913,872.91

1919—January.....	\$70, 996, 041. 14	
February.....	15, 816, 539. 27	
March.....	10, 143, 081. 68	
April.....	9, 572, 728. 48	
May.....	6, 558, 198. 33	
June.....	5, 269, 535. 51	
July.....	5, 176, 865. 12	
August.....	6, 201, 164. 07	
September.....	6, 111, 944. 78	
October.....	7, 316, 467. 60	
		\$143, 162, 565. 98
Total.....	1, 115, 076, 438. 89	

While, naturally, with the termination of the popular campaigns of the war period, which made instant appeal to the patriotic impulse of that time, sales dropped sharply to a lower level, the upward trend appearing in the figures for the recent months indicates that the efforts of the savings organization to combat the present tendency to waste and extravagance which has come as a reaction to the war-time economies are now having their effect.

The redemptions for the same period have totaled \$204,391,451.45.

These redemptions were largely of the issues preceding 1919, and it is felt that they represent chiefly the release of securities purchased as a result of the war-time appeal by persons who were not prepared to hold them permanently as an investment.

The measure of the usefulness of the war-savings organization and of the savings movement is not to be found in the sales of war savings securities alone. The war-savings organization is charged with the duty of carrying on a movement for saving and investment in, and holding of, Government securities of all kinds—Liberty bonds, Victory notes, and Treasury certificates of indebtedness as well as war-savings securities. These activities of the savings organization are specifically contributory to the sale from time to time of Government securities of all kinds to finance the remainder of the war bills and the floating debt. The savings movement has two objects—first, to sell the war-savings securities; and, second, to develop and protect the secondary market for all war issues, to assure the permanence of the war-time achievement in selling Government securities to millions of investors among the American public, to increase the number of such investors, and to build up permanently habits of regular saving and investment in United States Government securities. The two objects focus to the same point, namely, promoting the steady purchase and holding of United States Government securities of all kinds. In addition to selling the war-savings securities, the organization carries on a work largely of an informational character designed to protect the value of the outstanding war loans and to prepare the market for new offerings. This involves a cam-

paign to defeat the efforts of traffickers who attempt to obtain the securities for less than the market prices or in exchange for worthless stocks or shares in fraudulent promotions, and also the dissemination of general information as to the value and desirability of Government securities. The most is made of every legitimate opportunity to impress the importance of saving and investment in Government securities upon the public through established publications and through special printed matter where it is believed that results can be obtained thereby. The present high cost of living has presented a real opportunity of service for the movement to enforce the realization that increased production, saving, and investment present the most direct and potent means of solving this pressing economic problem.

The organization has accomplished a very important work in organizing the savings movement in the schools of the country. It has been realized that the schools are a most important means of inculcating the saving habit and of building up for the future a body of people who have the habit of saving and the tendency to turn to Government securities for investment. The Department of the Interior, through its Bureau of Education, is rendering valuable cooperation. Important progress has been made in securing the cooperation of State superintendents of education and in obtaining the introduction of savings material in textbooks, and it is expected that next year the study of saving will be a part of the regular course in a very great number of public schools and other educational institutions throughout the country. The schoolrooms, to a large degree, have also been organized for the regular purchase of thrift and war-savings stamps.

Another very important work has been in establishing the movement in industrial and commercial organizations. A large number of associations, plants, and mercantile establishments have given the savings movement their indorsement and have organized savings societies for the regular purchase of the war-savings securities. The movement has also been indorsed and organized in women's clubs, fraternal organizations and labor bodies, and assistance has been received from the churches. Through the valuable cooperation of the Department of Agriculture, effective work has been done among agricultural organizations. The cooperation of the schools and the other organizations described not only has great present value, but it promises for the future a means to carry on the movement with a reduction of expense and of direct effort on the part of the Treasury and district savings organizations.

The sale of the war-savings securities will be continued in 1920, and the new series are now in course of preparation. Substantially the same thrift stamps and thrift cards now in use will be used

in 1920. The war-savings stamps and certificates and the Treasury savings certificates for 1920 will be substantially the same in terms and conditions, but some alterations will be made in the forms. The 1920 war-savings stamp will be carmine in color, will bear the head of George Washington, and the size will approximate the larger stamp used in 1918. The Treasury savings certificates, \$100 denomination, will be orange in color, and the \$1,000 denomination will be green.

The Treasury savings division was recently reorganized, and a similar reorganization is now in process in the districts, as a consequence of which it is hoped that they will render greater and more effective service in 1920, notwithstanding the fact that the expense of their operations will be materially less than in former years.

Detailed provisions for the surrender and exchange, by agents, of the war-savings stamps, series of 1918, and for the continuation, appointment and operations of agents for the year 1919 appear in Department Circulars Nos. 126, 130, and 131, the first dated December 10, 1918, and the latter two December 23, 1918, which are attached as Exhibits Nos. 45, 46, and 47, pages 308, 309 and 311.

LOANS TO FOREIGN GOVERNMENTS.

Under the acts of Congress of April 24, 1917, September 24, 1917, April 4, 1918, and July 9, 1918, the Secretary of the Treasury continued to establish credits in favor of foreign Governments engaged in war with enemies of the United States and to the extent of credits so established to make advances to such Governments through the purchase at par of their respective obligations. Since the last report credits were established in favor of Belgium, the Czecho-Slovak Republic, France, Great Britain, Greece, Italy, Roumania, and Serbia, and advances have been made to these countries and also to Cuba and Liberia under credits previously established. No credits were established in favor of Russia during the year, nor were any advances made to that country, and the balance of credit which had previously been established above the amount of the cash actually advanced was withdrawn. In certain instances, in which the purpose was accomplished for which a credit had been established or an advance had been made without requiring the total amount of the credit or the advance, the balance of credit was withdrawn or the unused portion of the advance was repaid. Certain other repayments were made in connection with the routine of the accounts. None of the repayments constitutes part of a general program of repayment by any foreign Government. The total appropriation provided by Congress for loans to foreign Governments is \$10,000,000,000. From April 24, 1917, up to November 15, 1919,

the credits established, after deducting credits which had been withdrawn, and the cash advances were as follows:

	Credits established.	Cash advanced.	Other charges against credits.	Balances under established credits.
Belgium.....	\$343,445,000.00	¹ \$338,745,000.00		\$4,700,000.00
Cuba.....	10,000,000.00	10,000,000.00		
Czechoslovakia.....	55,330,000.00	52,690,000.00		2,640,000.00
France.....	3,047,974,777.24	² 2,887,177,800.00	\$110,000,000.00	50,496,977.24
Great Britain.....	4,277,000,000.00	³ 4,277,000,000.00		
Greece.....	48,236,629.05		48,236,629.05	
Italy.....	1,620,922,872.99	1,610,922,872.99		10,000,000.00
Liberia.....	5,000,000.00	26,000.00		4,974,000.00
Roumania.....	25,000,000.00	25,000,000.00		
Russia.....	187,729,750.00	187,729,750.00		
Serbia.....	26,780,465.56	26,780,465.56		
Total.....	9,647,419,494.84	9,416,371,888.55	158,236,629.05	72,810,977.24

¹ \$10,000 of this amount repaid by the Belgian Government.

² \$12,147,000 of this amount repaid by the French Government.

³ \$57,164,007.99 of this amount repaid by the British Government.

It is difficult to exaggerate the great purposes served and the great results accomplished by these advances to foreign Governments. In the most critical stages of the war they immeasurably assisted America's gallant associates in obtaining the munitions, supplies, and equipment that were so imperatively needed to meet the enemy's offensives or to carry the fighting into his territory, and probably of equal importance was the fact that they served to hearten the allied armies and peoples by the knowledge that the vast credit resources of the United States were being shared with them for the effective prosecution of a common cause. Conversely, it is not difficult to estimate the disheartening effect that these loans of billions and the willingness of America to lend for the prosecution of the war as much more as was needed to the limit of her ability must have had upon the spirit and morale of the peoples and armies of the enemy.

In the beginning, before the creation of our great Army, the principal assistance of America was necessarily through foreign loans, and it was then that these advances proved so very potent in contributing to the final victory. Loans to Russia in 1917 kept that great nation in the war and held the German troops upon the eastern front for six precious months. Similarly in each grave crisis, whether on the Italian front or on the battle fields of France or Belgium, the loans from the United States gave the Allies the means of replenishing supplies and equipment, and inspired their fighting forces and the peoples behind them with renewed hope and confidence and with strengthened determination in the face of an advancing foe. The service of these loans in assisting to hold the battle fronts of Europe until the might of our heroic Army could be felt effectively, made possible, beyond the shadow of a doubt, the ending of the war in the

fall of 1918. Without this aid to the allied Governments, the war unquestionably would have been prolonged, if not lost, with the resultant great additional cost in life and treasure.

Detailed statements showing the dates and amounts of credits and advances to foreign Governments are attached hereto as Exhibits 48 and 49, pages 312 and 316.

Currencies needed by the United States in France, Great Britain, and Italy for our war expenditures in those countries continued to be provided by the respective foreign Governments under an arrangement whereby the dollar equivalent of the amounts so provided was made available to the respective foreign Governments for use to meet their war expenditures in the United States, and thus the needs of these Governments for advances from the United States were reduced by a corresponding amount. This plan was also extended to Belgium. The following tabulation shows the amount of foreign currencies so placed at the disposal of the United States and the dollar equivalents paid therefor in the United States for the period commencing during the month of January, 1918, up to November 15, 1919:

Country.	Francs.	Pounds sterling.	Lire.	Dollar equivalent.
Belgium	2,500,000.00	.....	.....	366,300.37
France	5,709,031,418.08	.....	.....	1,110,138,235.98
Great Britain .....	.....	87,768,387/13/1	.....	401,393,060.05
Italy .....	.....	.....	97,583,742.51	14,425,092.25
Total .....	.....	.....	.....	1,526,322,688.65

In June, 1918, the requirements of the American Expeditionary Forces for pesetas were indicated to the Treasury to be extremely heavy. At that time Spanish exchange was at a premium of about 40 per cent. In order to obviate the necessity of purchasing pesetas at so large a premium a representative of the Treasury went to Spain and in August, 1918, made arrangements whereby a syndicate of Spanish banks agreed to extend credits up to 250,000,000 pesetas to be availed of through the acceptance of bills drawn by American banks, members of the Federal Reserve System. In order to avail of this arrangement the Treasury sold certificates of indebtedness payable in pesetas. The total amount of credits availed of and of obligations so sold aggregated 155,000,000 pesetas. The bills were discounted on the basis of $4\frac{1}{2}$ per cent interest, which, together with the acceptance commission and certain other charges, made the total cost of the money at the rate of about $5\frac{1}{4}$ per cent per annum. Partly as a result of the credits so arranged the rate for Spanish exchange soon began to drop, and the Treasury has lately reduced by 80,000,000 pesetas the amount of its peseta obligations. So far as necessary this was done by the purchase of pesetas in the exchange market at par or less.

All interest which has become due on the obligations of foreign Governments held by the United States has been paid in cash with a relatively unimportant exception pending adjustment. To the extent that such interest has not been paid from other resources of the foreign Governments concerned it has been paid from the proceeds of loans made by the United States Government. With the termination of the war and the rapidly approaching exhaustion of the appropriation it was considered necessary and appropriate for the Secretary of the Treasury, as contemplated by the Liberty bond acts, to take up with the foreign Governments the funding of the demand obligations now held by the United States into long-time obligations and the funding during the reconstruction period, say for two or three years, of interest on the obligations. In view of the present derangement of the foreign exchanges it would add to the difficulties of the situation and would not be to the advantage of the United States to require cash payment of interest.

The authority given by first, second, third, and fourth Liberty bond acts to make loans to foreign Governments was for the purpose of national defense and the prosecution of the war. In order to assist in meeting needs growing out of the war, the Treasury recommended the enactment of legislation extending the authority within certain limits but without increasing the aggregate amount of the appropriation. By the Victory Liberty loan act approved March 3, 1919, the Secretary of the Treasury was authorized, within the \$10,000,000,000 previously appropriated, to make loans to foreign Governments then engaged in war with enemies of the United States for the purpose of providing for purchases of any property owned directly or indirectly by the United States not needed by the United States or of any wheat, the price of which has been or may be guaranteed by the United States. The Secretary of the Treasury is empowered to establish credits under this authority until the expiration of 18 months after the proclamation of peace. Thus far no credits have been established under this provision.

The Inter-Ally Purchasing Commission, constituted in August, 1917, through formal arrangements entered into by the Secretary of the Treasury with the approval of the President on behalf of the United States with representatives of the Governments of the Allies, was terminated on December 14, 1918, and such of its functions as it was desirable to continue were taken over by the Treasury. These functions came to an end when the foreign Governments ceased making new purchases to be paid for out of advances from the Treasury.

WAR LOAN ORGANIZATION.

The flotation of the Victory Liberty loan and the sales of certificates of indebtedness were conducted through the same form of organization which made such memorable successes of the previous offerings of war securities to the public. Under the general direction and guidance of the Treasury, the 12 Federal reserve banks, as fiscal agents of the United States, continued to serve as the centers of the War Loan Organization in their respective districts throughout which were organized Liberty loan committees composed of volunteers who operated in their respective localities in behalf of the Victory campaign.

During the months following the armistice and preceding the offering of the Victory loan, there developed a very natural desire on the part of the members of the War Loan Organization throughout the country, who had left their usual pursuits in life to serve the Government in the critical crisis of war, to return to their normal activities. These men and women were volunteers in the great cause of liberty; their families and businesses had been neglected and personal matters required their attention. It could not be expected that they would continue indefinitely in the volunteer service of the Government at the expense of every personal consideration and of their own livelihood. The patriotism and mettle of these workers were so well known to the Treasury that it was believed that an appeal for one more and final effort in a great popular campaign would receive a gratifying response.

On December 20, 1918, a few days after assuming the office of Secretary of the Treasury, I issued the following appeal for the continued support to the Treasury of the War Loan Organization.

The above statement was later followed by an announcement that the Victory loan would be the last Liberty loan; that is to say, the last war loan floated by means of a great popular campaign. It was anticipated that necessary future borrowings could be made in the form of certificates of indebtedness which, if need be, might be refunded by the issue of notes or bonds without the aid of another popular campaign, such as those of the Liberty loans.

That statement of policy saved the Liberty loan committees from disintegration, and saved the Victory loan from failure, because it could not have been floated as a popular issue without the services of these volunteer workers. As was to be expected from men and women of such proved sterling worth and exalted love of country, they answered the Treasury's call with definite assurances that a supreme effort would be made by every worker to make the loan a success that was comparable with the results of the issues sold during the period of actual warfare. These pledges were entirely ful-

filled and, with the disbandment of this great volunteer army of workers, the Treasury desires to make due acknowledgment of the value of their patriotic service and to express its sincere gratitude for the loyal and effective work which made the unprecedented results of the loans possible.

The Victory loan campaign conducted by the War Loan Organization pointed out the great investment value of the notes, and its keynote was an intensive call to the patriotism of the people to "finish the job" with the largest possible distribution of the securities. Banks, bankers, trust companies, business men, associations and societies, and thousands of men and women throughout the country patriotically cooperated with the Treasury and the War Loan Organization in making the last popular loan a splendid and unqualified success. Men and women in every part of the land patriotically and unselfishly devoted their best efforts through days of unflagging labor to the service of the Government, and richly earned the Nation's gratitude.

The organization for the sale of war savings securities is discussed elsewhere in this report under the heading "War savings certificates."

After the conclusion of the Victory loan, Lewis B. Franklin, of New York, who had served as director of the War Loan Organization from the beginning, resigned to return to private life, and was succeeded by John H. Mason, of Philadelphia, who had been a member of the Liberty loan organization of the Philadelphia Federal Reserve district, and who since the fall of 1918 had served as director of the organization in that district.

War loan publicity.

The publicity campaigns conducted by the War Loan Organization of the Treasury in the interest of the five war loans are without parallel in history. The campaign in behalf of the Victory issue was as intensive and widespread as those for the previous loans. It embraced every avenue of publicity and propaganda. All media of arousing the interest and inviting the attention of the people to the imperative needs of the Government and the great value of the Victory notes as a means of saving and investment were utilized. Machinery drafted for publicity purposes ranged from the seemingly insignificant subscriber's button to the mightiest engines of war from land and sea. The printed and spoken word of men prominent in all walks of life and the greatest art of the Nation were marshaled into service. The combined result was an agency that forcibly carried the message of the Treasury into every home in the country.

Newspapers, magazines, trade journals, and other publications gave unlimited space in their news and advertising columns to the

interest of the loan. Press associations carried columns of reading material. Millions of posters designed by leading artists, street-car advertising cards, and innumerable booklets were distributed. Five thousand widely known men and women spoke in behalf of the issue under direction of the Speakers' Bureau of the Treasury. More than 100,000 clergymen of all denominations delivered Liberty loan sermons, while Four-Minute Men to the number of several thousand spoke daily in theaters and at other places of assembly.

War exhibit trains traveled from city to city carrying American, allied, and captured German war matériel. Aerial demonstrations by celebrated aces were given in over 80 cities. Eighty-five thousand captured German helmets were presented to salesmen as prizes. Medals cast from German cannon were presented as rewards to workers. An honor flag was granted to cities that exceeded their quotas.

Theatrical managers and members of the profession cooperated heartily. Sales were made in theaters, and actors and actresses contributed of their time and talent to the success of the issue. Motion-picture theaters and stars of the profession gave their support unstintedly. Films were purchased at cost and many were contributed.

American soldiers, sailors, and marines from the camps and ships in America and from the army of Gen. Pershing and the fleet of Admiral Sims lent valiant aid to the campaign both as speakers and salesmen. Picked veterans from the armies of the nations associated with America in the war toured many cities of the country and captured German submarines were exhibited in important ports.

The above relates to the publicity which was conducted on a national scale. In addition, the publicity branch of the War Loan Organization in the Treasury supervised and coordinated the propaganda activities of the publicity committees in the several Federal reserve districts, which operated under the immediate direction of the Federal reserve banks. These committees conducted extensive campaigns of publicity that were of especial application locally or met the particular needs of the districts concerned. They heartily cooperated with the central organization in Washington and rendered service of very great magnitude and value.

Since the conclusion of the Victory loan, publicity has been continued in connection with the sale of certificates of indebtedness and thrift stamps and war savings stamps and certificates, and in promotion of the movement for saving and investment in Government securities.

NATIONAL WOMAN'S LIBERTY LOAN COMMITTEE.

The successful service of the national woman's Liberty loan committee and of its effective nation-wide organization of patriotic women

was brought to a notable climax in the Victory loan campaign. With the signing of the armistice and the natural tendency of all volunteers to feel that their services were no longer required, the disintegration of this organization seemed inevitable. In response to the appeal of the Treasury, however, the committee and each of its State chairmen assured the department that the organization would remain intact and efficient as long as its services were required in the loan operations of the Government. The entire organization redeemed that promise by the continuation of its splendid work during the Victory loan campaign.

The Treasury desires to record its deep appreciation of the effective service of the patriotic women who so loyally worked for the loans and cooperated with the department in each of the campaigns. The committee assisted in immeasurable degree in mobilizing the womanhood of the United States and in helping the mothers, wives, and sisters of the heroic sons of America who went to France for the sake of the liberty of their country and of mankind to understand the purposes of the war and the needs of the Government to prosecute it to a successful conclusion. The committee and its organization achieved a high degree of success in arousing the sentiment of the people and in obtaining subscriptions to the securities of the Government.

LIBERTY BONDS AND VICTORY NOTES OUTSTANDING.

On June 30, 1919, the total amount of Liberty bonds and Victory notes outstanding and deliverable was \$19,126,517,200. Exclusive of interim certificates which were issued only in connection with the first Liberty loan, this large amount was distributed in 78,710,703 pieces, represented by denominations ranging from \$50 to \$100,000. Of that number, 39,932,957, or more than one-half, consisted of \$50 bonds and notes. The number of \$50 and \$100 bonds and notes outstanding was 66,644,458, or more than 84 per cent of the total, while the number of \$50, \$100 and \$500 bonds and notes was 70,244,817, or more than 89 per cent of the total. These percentages would have been increased if the entire Victory loan had been issued by June 30. The Victory notes were in process of issue at that time and only a part of the total was outstanding at the close of the fiscal year.

The amount represented by the \$50 denomination on June 30, 1919, was \$1,996,647,850; by the \$100 denomination \$2,671,150,100; by the \$500 denomination \$1,800,179,500, and by the \$1,000 denomination \$7,936,230,000. These figures show that \$6,467,977,450 was represented by \$50, \$100 and \$500 bonds and notes, or approximately 33 per cent of the total outstanding. The combined total of \$50,

\$100, \$500 and \$1,000 denominations amounted to \$14,404,207,450, or 75 per cent of the total outstanding, while the combined total of the denominations ranging from \$50 to \$10,000 was \$18,331,117,450, or 95 per cent of the total amount outstanding.

While the large number of small bonds and notes which were still outstanding at the close of the fiscal year is encouraging as indicating the continued widespread distribution of the bonds among investors who never before had placed their savings in securities of any kind, unfortunately it is unquestionably true that a large number of small holders have parted with their bonds and notes when it was most desirable for themselves and their Government that they should hold them as investments. There is attached hereto as Exhibit 50, page 324, a detailed statement of denominational exchanges of all coupon Liberty bonds and Victory notes, by Federal reserve districts, up to September 30, 1919. The original deliveries of \$50 coupon bonds and notes amounted to \$2,661,386,150. Of these there was surrendered for denominational exchange a total of \$737,-806,600 and there was issued on denominational exchange a total of \$189,987,000 of \$50 coupon bonds and notes, making a net decrease in the amount of outstanding \$50 coupon bonds and notes on September 30, 1919, of \$547,819,600. The original deliveries of \$100 coupon bonds and notes amounted to \$3,196,166,800. Of these there was surrendered for denominational exchange a total of \$576,-129,500, and there was issued on denominational exchange a total of \$132,848,100 of \$100 coupon bonds and notes, making a net decrease in the amount of outstanding \$100 coupon bonds and notes on September 30, 1919, of \$443,281,400. The original deliveries of \$1,000 coupon bonds and notes amounted to \$9,417,227,000. Of these there was surrendered for denominational exchange a total of \$445,039,000, and there was issued on denominational exchange a total of \$1,540,-545,000 of \$1,000 coupon bonds and notes, making a net increase in the amount of outstanding \$1,000 coupon bonds and notes of \$1,095,-506,000 on September 30, 1919.

It is obviously impossible to demonstrate what proportion of the bonds and notes surrendered for the purposes of exchange into other denominations have been sold, but unquestionably a large part of the transactions mentioned above represent sales of the small denominations. This assumption is borne out by the large amount of such bonds or notes which were exchanged for higher denominations, particularly the \$1,000 denomination. The observation of the Department has been that in practically all cases the high point of surrender of the securities for the purpose of exchange appears to be at or near the termination of the life of partial payment plans. This would indicate that many small investors, as soon as they com-

plete the payment for their securities, offer them on the market for sale. It is a great mistake for the people of the country, who patriotically bought the Government's obligations during the period of the war, to forego the great advantages which accrue to them by holding their securities. They represent savings which will improve their welfare, and rather than part with them they should determine upon a course of further saving and invest their accumulations in Government obligations. It is sincerely to be hoped that all holders of Liberty bonds and Victory notes will retain and increase their investments and dispose of them only under the pressure of compelling necessity.

The following table shows in detail the outstanding issues of Liberty bonds and Victory notes, by denominations, at the close of the fiscal year.

Liberty bonds and Victory notes outstanding, by denominations, June 30, 1919.

Loans.	Total.									
	\$50	\$100	\$500	\$1,000	\$5,000	\$10,000	\$50,000	\$100,000		
First Liberty loan 3½ per cent bonds of 1932-1947 and interim certificates:										
Coupon.....	\$57,946,350	\$69,795,000	\$68,018,000	\$923,700,000						\$1,119,459,350
Registered.....		3,957,500	4,266,000	21,569,000	\$24,920,000	\$76,700,000	\$44,850,000	\$112,600,000		288,892,500
Interim certificates.....										1,749,750
First Liberty loan converted 4 per cent bonds of 1932-1947:										
Coupon.....	42,517,900	48,499,900	22,816,000	30,926,000	1,310,000	680,000	300,000			146,729,800
Registered.....	401,950	3,061,500	4,410,500	7,059,000	1,870,000	1,960,000				21,062,950
First Liberty loan converted 4½ per cent bonds of 1932-1947:										
Coupon.....	29,939,500	55,181,000	54,644,500	144,947,000	16,210,000	15,930,000				316,852,000
Registered.....	1,190,700	7,780,900	13,092,500	28,029,000	11,635,000	13,610,000	5,650,000	5,600,000		89,588,100
First Liberty loan second converted 4½ per cent bonds of 1932-1947:										
Coupon.....	276,550	379,800	260,000	1,218,000	105,000	140,000				2,379,350
Registered.....	31,700	123,000	164,000	349,000	155,000	290,000				1,112,700
Second Liberty loan 4 per cent bonds of 1927-1942:										
Coupon.....	163,361,500	173,255,400	84,233,500	168,221,000	15,410,000	13,980,000				618,261,400
Registered.....	4,142,150	14,578,300	13,532,500	23,790,000	9,150,000	10,100,000	7,650,000	3,000,000		85,942,950
Second Liberty loan converted 4½ per cent bonds of 1927-1942:										
Coupon.....	124,721,500	196,634,900	197,000,500	1,223,864,000	215,540,000	460,070,000				2,417,830,900
Registered.....	4,453,650	21,024,200	37,424,500	53,839,000	49,020,000	91,210,000	39,450,000	107,400,000		444,421,350
Third Liberty loan 4½ per cent bonds of 1928:										
Coupon.....	555,450,250	603,876,600	352,259,500	1,374,936,000	181,430,000	359,880,000				3,427,832,350
Registered.....	15,099,050	58,497,800	63,915,500	109,048,000	43,941,000	60,970,000	37,650,000	133,500,000		539,720,350
Fourth Liberty loan 4½ per cent bonds of 1933-1938:										
Coupon.....	715,355,650	897,695,500	501,403,000	2,425,595,000	427,125,000	965,420,000				5,932,594,150
Registered.....	26,192,150	108,313,400	103,415,000	172,057,000	57,330,000	120,320,000	46,300,000	216,900,000		860,887,550
Four and three quarters per cent Victory Liberty loan notes of 1922-1923:										
Coupon.....	252,601,050	384,758,700	246,486,000	894,724,000	152,180,000	306,750,000				2,237,499,750
Registered.....	2,862,500	20,792,300	30,887,000	65,877,000	15,895,000	14,430,000	7,700,000	17,800,000		176,743,800
Three and three-quarters per cent Victory Liberty loan notes of 1922-1923:										
Coupon.....	392,000	927,500	1,906,500	225,911,000	36,530,000	131,180,000				396,757,000
Registered.....	1,750	16,900	44,500	571,000	1,355,000	2,740,000	2,600,000	4,700,000		12,229,130
Total:										
Coupon.....	1,942,272,250	2,431,004,300	1,529,027,500	7,414,042,000	1,045,840,000	2,254,010,000				16,616,196,050
Registered.....	54,375,000	240,145,800	271,152,000	522,188,000	225,230,000	401,830,000	192,150,000	601,500,000		2,508,571,400
Interim certificates.....										1,749,750
Grand total.....	1,996,647,850	2,671,150,100	1,800,179,500	7,936,230,000	1,271,070,000	2,655,840,000	192,150,000	601,500,000		19,126,517,200
Total number of pieces (exclusive of interim certificates).....	39,932,957	26,711,501	3,600,359	7,936,230	254,214	285,384	3,843	6,015		78,710,703

A recapitulation of transactions in Liberty bonds and Victory notes from the dates of the respective issues to June 30, 1919, separately compiled for each loan, is embraced in Exhibit 51, page 338. These figures indicate that in the vast operations of the five loans the department issued securities of an aggregate value of \$27,868,140,100, of which \$8,814,442,250 had been retired through conversion, exchange, purchase, etc. Including \$72,819,350 of securities in process of issue against securities canceled, the amount outstanding on June 30, 1919, was, as stated above, \$19,126,517,200.

There is attached hereto Form L & C 265, dated October 16, 1919, which shows the dates on which interest on the various issues of Liberty bonds and Victory notes is payable and the amount of any interest coupon pertaining to any bond or note of the Liberty issues.

CONVERSION OF LIBERTY BONDS.

On January 15, 1919, attention of the Congress was drawn to the fact that a large number of holders of 4 per cent Liberty bonds had not exercised the privilege of converting such bonds into 4½ per cent bonds, and announcement was made that a recommendation would be submitted for the extension of the privilege, which had expired on November 9, 1918. It was believed that those who had not availed themselves of the conversion privilege fell chiefly among the group of small holders who were unaccustomed to bond investments and who, on account of the very wide distribution of Liberty bonds, were not reached by the general public announcements of the Treasury and could not, except in the case of registered bonds, be reached by department circular. The Congress adopted the recommendation of the Treasury, and in section 5 of the Victory Liberty loan act authorized the extension of the privilege of converting the 4 per cent bonds of the first Liberty loan converted and the 4 per cent bonds of the second Liberty loan into 4½ per cent bonds for such period and upon such terms and conditions and subject to such rules and regulations as the Secretary of the Treasury may prescribe. Regulations governing these conversions are embodied in Department Circular No. 137, dated March 7, 1919, and in the supplements thereto dated June 10, 1919, and November 1, 1919. Under the terms of these circulars the extended privilege may be terminated on six months' public notice given in such manner as the Secretary of the Treasury shall prescribe.

In spite of this extension of the conversion privilege and the publicity which has been given to it, approximately \$750,000,000 face amount of 4 per cent Liberty bonds in coupon form remained outstanding unconverted on September 1, 1919. Of these coupon bonds, the second Liberty loan 4 per cent bonds had no coupons attached for interest accruing after November 15, 1919, and the first Liberty

loan converted 4 per cent bonds had no coupons attached for interest accruing after December 15, 1919. On and after said dates, respectively, these bonds would become exchangeable, according to their terms, for like bonds with all subsequent coupons attached, but if not presented for conversion until said dates, respectively, would not be deemed to be converted until May 15 and June 15, 1920, respectively, and the bonds issued upon conversion would not begin to bear interest at $4\frac{1}{4}$ per cent per annum until said dates. The $4\frac{1}{4}$ per cent bonds so issued would have no coupons attached, and would be exchangeable on and after said dates, respectively, for like bonds with all subsequent coupons attached.

In order to avoid expense to the United States and inconvenience to holders of the 4 per cent coupon Liberty bonds, and in order to make the necessary provisions for the payment of the 4 per cent interest accruing thereon after November 15 and December 15, 1919, respectively, special rules and regulations were accordingly prescribed governing the exchange and conversion of 4 per cent coupon bonds of the second Liberty loan and of the first Liberty loan converted. These rules and regulations are set forth in full in Treasury Department Circular No. 158, dated September 8, 1919, and are in substance as follows:

(1) Holders of 4 per cent coupon bonds of the second Liberty loan and of the first Liberty loan converted desiring to avail themselves of the conversion privilege were urged to present them for conversion promptly, *before* November 15, 1919, and December 15, 1919, respectively, and it was provided that in that event they would be deemed to present their bonds for conversion only and would receive upon such conversions bonds bearing interest at $4\frac{1}{4}$ per cent per annum from November 15, 1919, and December 15, 1919, respectively, with coupons attached covering interest to May 15, 1920, and June 15, 1920, respectively.

(2) Holders of 4 per cent coupon bonds of the second Liberty loan and of the first Liberty loan converted desiring to avail themselves of the conversion privilege but neglecting to present their bonds for conversion before November 15, 1919, and December 15, 1919, respectively, were advised to retain their 4 per cent coupon bonds temporarily until the Treasury Department should announce that the $4\frac{1}{4}$ per cent coupon bonds of the second Liberty loan converted and of the first Liberty loan converted with coupons attached covering interest to maturity were available for delivery (which, it is expected, will be about March 15, 1920), and then present their 4 per cent bonds promptly for conversion and exchange into such $4\frac{1}{4}$ per cent bonds. In this connection, it was provided that all 4 per cent coupon Liberty

bonds presented on or after November 15, 1919, and December 15, 1919, respectively, for exchange into bonds with all subsequent coupons attached would, unless otherwise expressly indicated in writing by the holder, be deemed to be presented for conversion into 4½ per cent bonds, as well as for exchange, and be held in suspense pending the date when the 4½ per cent bonds with all subsequent coupons attached should be available for delivery.

(3) It was further provided that, after November 15, 1919, and December 15, 1919, respectively, 4 per cent bonds of the second Liberty loan and of the first Liberty loan converted, with all subsequent coupons attached, would be issued in exchange for the 4 per cent bonds for which they are expressed to be exchangeable, if specifically requested, but that it was not expected that such permanent 4 per cent bonds would be available for delivery before March 15, 1920.

The following statement, by denominations, of unconverted 4 per cent bonds outstanding on June 30, 1919, indicates that the amount is chiefly in the hands of small investors:

Outstanding June 30, 1919.

Denomination.	First 4's.	Second 4's.
\$50	\$42,919,850	\$167,303,650
100	53,561,400	187,833,700
500	27,226,500	97,766,000
1,000	37,985,000	192,011,000
5,000	3,180,000	24,560,000
10,000	2,620,000	24,080,000
50,000	300,000	7,650,000
100,000	-----	3,000,000
	167,792,750	704,204,350

On April 24, 1919, the privilege of converting 3½ per cent bonds of the first Liberty loan into first Liberty loan second converted 4½ per cent bonds expired pursuant to the terms of Department Circular No. 123, dated October 24, 1918, set forth as an exhibit to the previous annual report. Only \$3,492,050 face amount of 4½ per cent bonds were issued pursuant to this conversion privilege.

The following tabulation shows the total conversions of Liberty bonds from the dates when the respective privileges arose to the termination thereof, or to June 30, 1919:

First Liberty loan converted 4 per cent bonds of 1932-1947, Nov. 15, 1917-May 15, 1918.

Surrendered for conversion:

First Liberty loan 3½ per cent interim certificates of 1932-1947 . . .	\$473,917,250
First Liberty loan 3½ per cent coupon bonds of 1932-1947	89,103,500
First Liberty loan 3½ per cent registered bonds of 1932-1947	5,297,700
Total	<u>568,318,450</u>

Issued upon conversion:

First Liberty loan converted 4 per cent coupon bonds of 1932-1947.	\$498, 275, 700
First Liberty loan converted 4 per cent registered bonds of 1932-1947.	70, 042, 750
Total	568, 318, 450

First Liberty loan converted 4½ per cent bonds of 1932-1947, as of June 30, 1919.

Surrendered for conversion:

First Liberty loan 3½ per cent coupon bonds of 1932-1947.	\$6, 118, 650
First Liberty loan 3½ per cent registered bonds of 1932-1947.	1, 454, 800
First Liberty loan converted 4 per cent coupon bonds of 1932-1947.	344, 648, 850
First Liberty loan converted 4 per cent registered bonds of 1932-1947.	53, 220, 850
Total	405, 443, 150

Issued upon conversion:

First Liberty loan converted 4½ per cent coupon bonds of 1932-1947.	326, 718, 150
First Liberty loan converted 4½ per cent registered bonds of 1932-1947.	78, 725, 000
Total	405, 443, 150

First Liberty loan second converted 4½ per cent bonds of 1932-1947, Oct. 24, 1918-Apr. 24, 1919.

Surrendered for conversion:

First Liberty loan 3½ per cent coupon bonds of 1932-1947.	\$2, 900, 550
First Liberty loan 3½ per cent registered bonds of 1932-1947.	591, 500
Total	3, 492, 050

Issued upon conversion:

First Liberty loan second converted 4½ per cent coupon bonds of 1932-1947.	2, 442, 900
First Liberty loan second converted 4½ per cent registered bonds of 1932-1947.	1, 049, 150
Total	3, 492, 050

Second Liberty loan converted 4½ per cent bonds of 1927-1942, as of June 30, 1919.

Surrendered for conversion:

Second Liberty loan 4 per cent coupon bonds.	\$2, 715, 294, 400
Second Liberty loan 4 per cent registered bonds.	319, 315, 450
Total	3, 034, 609, 850

Issued upon conversion:

Second Liberty loan 4½ per cent coupon bonds.	2, 620, 595, 200
Second Liberty loan 4½ per cent registered bonds.	414, 014, 650
Total	3, 034, 609, 850

No privilege of conversion arose with respect to previous issues of Government securities by reason of the issue of Victory notes.

INTERCONVERSION OF VICTORY NOTES.

Under the terms of the offering of the Victory Liberty loan, the two series of notes of that issue, bearing interest, respectively, at $3\frac{1}{4}$ per cent and $4\frac{1}{4}$ per cent per annum, are freely interconvertible throughout their life, subject to the terms of the circular offering the notes and the rules and regulations of the Secretary of the Treasury. Rules and regulations governing the exercise of the conversion privilege are embodied in Department Circular No. 139, dated May 20, 1919, and supplement thereto, dated November 1, 1919. The issue of the notes upon full-paid subscriptions was sufficiently advanced to permit the opening of the conversion privilege on July 15, 1919.

EXCHANGE AND TRANSFER OF LIBERTY BONDS AND VICTORY NOTES.

From the beginning of the war to the close of the fiscal year 1919 there were 17,373,132 Liberty bonds and Victory notes exchanged or transferred in an aggregate face amount of \$2,661,104,450, the transactions including exchange of coupon for registered issues, and vice versa, denominational exchanges and transfers of registered issues. Transactions involving coupon issues only were conducted chiefly at the Federal reserve banks as fiscal agents of the United States. While some transactions in connection with the registered issues were conducted in part at the Federal reserve banks, all such exchanges or transfers are finally consummated at the Treasury, where the record of registered bonds is kept.

Treasury Department Circular No. 141, dated September 15, 1919, establishes rules and regulations governing transactions in Liberty bonds and Victory notes. There was also issued on the same date a statement giving information with respect to the registration of bonds and notes. The widest possible distribution of these announcements has been made in order to familiarize the people with the method of effecting exchanges and transfers. A copy of the circular and of the statement were sent to every bank and trust company in the United States, accompanied by a letter urging their cooperation in handling transactions for their customers.

This circular covers the matter of exchange and transfer of Liberty bonds and Victory notes in detail, including such important matters as assignments in case of death of a registered owner, assignments for minors, and the rules respecting bonds or notes registered in the names of two or more persons. It also sets forth the officers authorized to witness assignments. The Treasury is anxious to facilitate the assignments of registered bonds and notes, but its policy in this

respect must be controlled by considerations of safety to the Government and to the registered holder. The department believes it has gone as far as it may with security in conferring general authority with respect to witnessing assignments. The Treasury must rely upon the good faith of the witnessing officer in requiring positive identification of the registered holder executing the assignment, and it is deemed wise to restrict the general authority to witness assignments to certain Treasury and other Federal officers, the executive officers of the Federal reserve banks, and the executive officers of incorporated banks and trust companies.

From the beginning of the war-loan operations the Treasury has been particularly anxious to afford every possible inducement to investors in Government securities to hold them in registered form. This is particularly desirable in the case of the small denominations which are in the hands of people who have no facilities for safekeeping, and the department has repeatedly urged upon the public the great advantages of registration. The result of its efforts in this direction may be seen from the fact that the registered issues of the first four loans up to June 30, 1919, had increased over \$600,000,000 from the time of original deliveries.

PURCHASES OF LIBERTY BONDS BY THE TREASURY.

The authority conferred upon the Secretary of the Treasury by section 6 of the act approved April 4, 1918 (Third Liberty bond act), to purchase Liberty bonds in order to stabilize the market prices of the securities, has been exercised from time to time during the year. Liberty bonds have been purchased, canceled and retired in accordance with the law, as necessary to support the market. As a matter of practical convenience the services of the War Finance Corporation have been utilized in this connection. The bonds have been purchased by the corporation at the market price for its own account, and subsequently the accumulated stocks have been taken over by the Treasury at the average cost to the corporation, plus accrued interest.

These purchases have served the purposes of the law, particularly when heavy sales were pressing upon the market. Many of these sales were the result of conditions produced by the ending of the war. Some of the smaller holders, who changed their occupations during the winter on account of the dislocation of industries, found it necessary to dispose of their securities. Large corporations that during the war had been able to hold Government bonds, either with their own resources or on borrowed capital, also found it necessary to liquidate on account of changed financial conditions due to economic dislocation attendant upon the ending of the war. During all this period without endeavoring to hold the bonds to levels that could

not be maintained, it was the constant endeavor of the Treasury to maintain the stability of the market for Government securities. The terms of the Victory loan had a favorable influence on the market situation.

The following bonds have been purchased, canceled, and retired by the Treasury from the bond-purchase fund to November 15, 1919:

Liberty bonds purchased from bond-purchase fund from Apr. 12, 1918, to Nov. 15, 1919.

Loan.	Principal amount purchased.	Amount paid.	Amount of accrued interest paid.
First Liberty loan converted 4 per cent and $4\frac{1}{2}$ per cent bonds of 1932-1947.....	\$25,115,000	\$23,841,677.60	\$398,633.59
Second Liberty loan 4 per cent and converted $4\frac{1}{2}$ per cent bonds of 1927-1942.....	371,215,000	353,346,965.55	6,364,544.95
Third Liberty loan $4\frac{1}{2}$ per cent bonds of 1928.....	208,635,500	200,895,398.00	1,687,060.05
Fourth Liberty loan $4\frac{1}{2}$ per cent bonds of 1933-1938.....	348,115,000	329,821,485.00	5,052,217.71
Total.....	953,080,500	907,905,526.15	13,502,456.30

The difference between the par amount of bonds purchased and the principal amount paid therefor, \$45,174,973.85, appears on the books of the Treasury as a miscellaneous receipt.

Section 3 of the act approved April 24, 1917 (first Liberty bond act), and section 3 of the act approved September 24, 1917 (second Liberty bond act), as amended, authorize the Secretary of the Treasury to apply any repayments of the principal of loans to foreign Governments to the redemption or purchase of any bonds issued under authority of such acts. Certain of the loans to foreign Governments have been repaid, as stated elsewhere in this report under the heading "Loans to foreign Governments," and the proceeds of the repayments have been applied to the purchase of Liberty bonds, which have been canceled and retired, as follows:

Bonds purchased as the result of payment of foreign loans, to Nov. 15, 1919.

OBLIGATIONS OF FOREIGN GOVERNMENTS REPAID.

Government.	Date.	Amount repaid.
France.....	Jan. 1, 1919	\$3,384,000.00
Do.....	Mar. 31, 1919	588,000.00
Do.....	Mar. 14, 1919	3,598,000.00
Belgium.....	July 18, 1919	10,000.00
France.....	Aug. 11, 1919	4,577,000.00
Great Britain.....	do.....	22,000,000.00
Do.....	Sept. 18, 1919	10,000,000.00
Do.....	Sept. 23, 1919	10,000,000.00
Do.....	Oct. 11, 1919	7,164,007.99
Do.....	Oct. 27, 1919	8,000,000.00

Bonds purchased as the result of payment of foreign loans, to Nov. 15, 1919—Continued.

BOND PURCHASES.

Loan.	Principal amount purchased.	Amount paid.	Amount of accrued interest paid.
Third Liberty loan 4½ per cent bonds of 1928.....	\$62, 297, 200	\$59, 090, 313. 78	\$702, 901. 66
Fourth Liberty loan 4½ per cent bonds of 1933-1938.....	2, 514, 950	2, 230, 482. 32	51, 690. 47
Total.....	64, 812, 150	61, 320, 796. 10	754, 592. 13

The bond-purchase fund, while designed primarily for another and more immediate purpose, has operated also, as the above analysis shows, in the nature of a preliminary sinking fund in advance of the operation of a scientific plan for the retirement of the debt through purchases or redemptions over a period of years. The authority to purchase bonds through the bond-purchase fund expires one year after the termination of the war. The Congress, however, has already provided the plan for the gradual retirement of the debt by means of a cumulative sinking fund.

CUMULATIVE SINKING FUND.

Provision for the establishment of a cumulative sinking fund in the Treasury for the retirement of bonds and notes issued under the first, second, third, and fourth Liberty bond acts and the Victory Liberty loan act is made by section 6 of the act approved March 3, 1919, in accordance with recommendations submitted by the Treasury and adopted by the Congress. The law permanently appropriates for such sinking fund for the fiscal year beginning July 1, 1920, and for each fiscal year thereafter until the debt is discharged an amount equal to the sum of "(1) 2½ per centum of the aggregate amount of such bonds and notes outstanding on July 1, 1920, less an amount equal to the par amount of any obligations of foreign governments held by the United States on July 1, 1920, and (2) the interest which would have been payable during the fiscal year for which the appropriation is made on the bonds and notes purchased, redeemed, or paid out of the sinking fund during such year or in previous years."

It will be noted that the Secretary of the Treasury, in accordance with the terms of this law, will ascertain the aggregate amount of such bonds and notes outstanding on July 1, 1920, less the par amount of obligations of foreign governments held by the United States on that date. Two and one-half per cent of that sum is appropriated annually as a fixed amount and without variation for the payment of such bonds and notes at maturity or for their redemption or purchase before maturity. As bonds or notes are paid,

redeemed, or purchased from this appropriation, there is also appropriated yearly and cumulatively for the sinking fund an amount equivalent to the interest which would have been payable on such bonds or notes if they had not been retired.

A cumulative sinking fund has the advantage of making the amount to be set aside for the service of the debt both on account of interest and sinking fund substantially a permanent item at a fixed figure until the debt is retired. The maturities and redemption dates for Liberty loan bonds, as stated in my testimony before the Ways and Means Committee, were arranged with great wisdom and thoughtfulness by Secretary McAdoo, the bonds of the second loan being redeemable during the period between 1927 and 1942, those of the third loan being payable in 1928, those of the fourth loan being redeemable during the period between 1933 and 1938, and those of the first loan being redeemable during the period between 1932 and 1947. The notes of the Victory Liberty loan are of short maturity, being redeemable in 1922 and payable in 1923. With redemption dates and maturities stretching over the period from 1922 to 1947, it will always be in the power of the Government to use the sinking fund effectively for the redemption or payment of bonds and notes of the Liberty loans.

It is calculated that the operation of the cumulative sinking fund provision will retire the funded war debt of the United States in the neighborhood of twenty-five years, except with respect to an amount equal to the loans to foreign governments outstanding on July 1, 1920. The retirement of the latter is provided for by the authority to apply repayments of foreign obligations to the retirement of United States obligations, and as foreign obligations are paid a corresponding amount of United States obligations may be redeemed or purchased, and canceled and retired.

The act of March 3, 1919, also repealed the old sinking-fund statutes which had proved unworkable and resulted in nothing more or less than a bookkeeping account. They did not retire the debt. The new law which takes the place of the provisions thus repealed can never descend to the state of uselessness which they occupied as long as the Government keeps faith with investors in its obligations. The formal offering of the Victory Liberty loan by Department Circular No. 138 quoted the cumulative sinking-fund section of the Victory Liberty loan act. To make the plan effective, sinking-fund charges must be met out of revenues received from taxation. Any thought in the future of suspending the operation of the cumulative sinking fund or of meeting its charges through the sale of securities would be not only unwise in the extreme from the standpoint of the Government's finances and the ultimate wiping out of the war debt

but would be a breach of faith with every subscriber to the Victory Liberty loan and with every holder of the Liberty bonds. Whatever may be necessary in the future financing of the Government, nothing must be permitted to interfere with the effective operation of the cumulative sinking fund and the consequent gradual retirement of the war debt.

VICTORY LIBERTY LOAN SUBSCRIPTIONS BY PERSONS IN THE MILITARY AND NAVAL FORCES.

At the time of the Victory Liberty loan campaign, both military and naval forces were undergoing rapid demobilization, and the efforts of the Treasury and of the War and Navy Departments in connection with the purchase of Victory notes by soldiers and sailors were directed chiefly toward affording them full opportunity to place subscriptions on reasonable terms. Under date of April 21, 1919, the Secretary of the Treasury promulgated regulations defining special arrangements for subscriptions from persons in the military forces. These regulations followed the same general lines as were in force for the third and fourth Liberty loans, as reported in the annual report for the fiscal year 1918, payments being made, however, by reservations from pay instead of by allotments of pay. In addition, Treasury regulations defining special arrangements for subscriptions by persons in the naval forces were prescribed by the Secretary for the first time, under date of April 21, 1919. These regulations followed the same lines as those prescribed for the Army, payment being made for the notes subscribed for by means of checkages against pay. Cash sales to persons in the military and naval forces also were made in considerable amounts during the campaign with the cooperation of the respective departments.

The total subscriptions for Victory notes reported by the Army under the special regulations, including cash sales, amounted to \$1,906,050, and the total subscriptions reported by the Navy under the special plan, including cash sales, amounted to \$6,912,750.

Apart from the subscriptions made by members of the military and naval forces, many officers and men, by speeches and other activities, imparted a marked additional stimulus to the general Liberty loan campaign.

ACCEPTANCE OF LIBERTY BONDS AS SECURITY.

In accordance with the recommendation contained in the annual report for the fiscal year 1918, provision was made by section 1320 of the revenue act of 1918, approved February 24, 1919, for the acceptance of Liberty bonds and other United States bonds as security in

lieu of surety or sureties on penal bonds. For the purpose of this statute, the term penal bond is defined to include any recognizance, stipulation, bond, guaranty, or undertaking, with surety or sureties, required to be furnished by the laws of the United States or regulations made pursuant thereto. Pursuant to the authority so conferred, the Secretary has prescribed detailed rules and regulations for carrying the section into effect, in Treasury Department Circular No. 154, dated June 30, 1919. Complete figures as to the bonds deposited in lieu of surety or sureties pursuant to this circular are not available, inasmuch as the bonds may be accepted by bond-approving officers of the Government generally, and may be deposited with the Federal reserve banks and branches as well as with the Treasurer of the United States. More than \$520,000 face amount of bonds so accepted, however, had been deposited with the Treasurer of the United States up to October 31, 1919.

Special regulations also have been issued in line with this statute and circular, under which Liberty bonds may be accepted as security in lieu of penal bonds to secure the payment of floor taxes on distilled spirits, tobacco manufactures, and other commodities, and as security for claims for abatement, and in connection with replacement funds. The following amounts of Liberty bonds have been received by the Bureau of Internal Revenue and held as security for the payment of floor taxes or otherwise taken as security in lieu of sureties:

Received during the fiscal year ended June 30, 1918.....	\$4,431,450
Received during the fiscal year ended June 30, 1919.....	1,269,300
Received from June 30 to Oct. 31, 1919.....	5,050
Total.....	5,705,800

ACCEPTANCE OF LIBERTY BONDS AND VICTORY NOTES IN PAYMENT OF ESTATE OR INHERITANCE TAXES.

As stated in the annual report for the fiscal year 1918, the act of April 4, 1918, added a new section, 14, to the act approved September 24, 1917, known as the second Liberty bond act, providing that bonds of the United States bearing interest at a higher rate than 4 per cent per annum might be accepted at par and accrued interest, under rules and regulations prescribed by the Secretary of the Treasury, in payment of estate or inheritance taxes imposed by the United States, if owned continuously by the decedent for at least six month prior to the date of death and a part of his estate at the time of death. Pursuant to this section, detailed rules and regulations governing the acceptance of Liberty bonds for estate or inheritance taxes were prescribed by the Secretary in Treasury Department Circular No. 132, dated January 30, 1919. The act of March 3, 1919,

known as the Victory liberty loan act (Exhibit 7, page 235) added to the second Liberty bond act a new section, No. 18, authorizing the issue of notes of the United States, subdivision (d) of which extended the provisions above described to notes issued under authority of said section. Pursuant to this provision, the 4½ per cent Victory notes will be receivable in payment of estate or inheritance taxes, and rules and regulations governing their acceptance have been prescribed in Treasury Department Circular No. 151, dated June 24, 1919. The 3½ per cent Victory notes are not under existing law acceptable in payment of estate or inheritance taxes.

The following table shows the total face amounts of Liberty bonds accepted in payment of estate or inheritance taxes up to and including October 31, 1919:

Loan.	Par amount of bonds.	Interest paid.
First Liberty loan converted 4½ per cent bonds.....	\$16,450	\$101.72
Second Liberty loan converted 4½ per cent bonds.....	143,350	1,439.68
Third Liberty loan 4½ per cent bonds.....	109,300	1,324.13
Fourth Liberty loan 4½ per cent bonds.....	2,000	29.37
Total.....	271,100	2,894.90

LOANS SECURED BY OBLIGATIONS OF THE UNITED STATES.

Section 5200 of the Revised Statutes as amended by the acts of September 24, 1918, March 3, 1919, and October 22, 1919, authorizes any national bank to lend to a single borrower, on the security of Liberty bonds, Victory notes, or Treasury certificates of indebtedness, to a practically unlimited extent if such loans conform to the regulations prescribed by the Comptroller of the Currency with the approval of the Secretary of the Treasury. Under these regulations it is provided that in addition to a loan amounting to 10 per cent of the unimpaired capital and surplus fund, already permitted by law, a national bank may grant another loan to the same borrower amounting to 10 per cent of the unimpaired capital and surplus if secured by a like face amount of Liberty bonds, Victory notes, and certificates of indebtedness of the United States issued since April 24, 1917, and a further unlimited amount if secured by such obligations having a face value of \$105 for every \$100 loaned.

It is believed that this increased authority to lend on the security of Government obligations had a very beneficial effect in aiding in the flotation of the fourth Liberty loan, the largest of the four Liberty loans placed, and also aided in the placing of the Victory notes.

The regulations promulgated by the Comptroller of the Currency and approved by the Secretary of the Treasury enabled the national banks to make these loans to an unlimited extent as long as the loans were secured by 105 per cent of Liberty bonds, Victory notes,

or Treasury certificates of indebtedness, "until December 31, 1920, or until such later date as the Comptroller of the Currency, with the approval of the Secretary of the Treasury, may prescribe."

The mere fact that national banks had the right to lend to customers on the security of Liberty bonds to this unlimited extent had a stimulating effect even upon buyers of Liberty bonds who did not have occasion to pledge their holdings. The knowledge that they could borrow on them if they needed to do so naturally encouraged many to subscribe for more than they would otherwise have taken.

The sworn reports of the national banks show that on September 12, 1919, the total amount of Liberty bonds of all issues upon which all national banks were lending was \$915,211,000.

The amount of Treasury certificates of indebtedness upon which the national banks were lending on the same date was \$32,379,000.

These figures are interesting when we consider that the total amount of Liberty bonds placed through the national banks was \$8,603,711,205, or 50.6 per cent, a majority of the entire allotments by the Government, amounting to approximately \$17,000,000,000.

These records, therefore, show that on September 12, 1919, the national banks were making loans on less than 5½ per cent of the total amount of Liberty bonds which the Government allotted.

The amount of Victory notes allotted by the Government was \$4,500,000,000. On September 12, 1919, the national banks reported that the total amount of Victory notes held as collateral aggregated \$297,819,000.

LIBERTY LOAN SUBSCRIPTIONS IN DEFAULT.

Pursuant to the provisions of Treasury Department Circular No. 78, dated May 14, 1917, offering the first Liberty loan for subscription, the Secretary of the Treasury has declared forfeited all delinquent first Liberty loan subscriptions filed with an official agency, together with all payments made thereon and all right and interest in the bonds allotted. This forfeiture was declared by Treasury Department Circular No. 135, dated February 5, 1919. Pursuant to this circular all forfeited installment payments are covered into the Treasury to the credit of miscellaneous receipts.

Similar action has been taken pursuant to the provisions of Treasury Department Circular No. 90, dated October 1, 1917, offering the second Liberty loan for subscription, as to all delinquent subscriptions to the second Liberty loan, by Treasury Department Circular No. 156, dated November 15, 1919.

COUPON LIBERTY BONDS IN PERMANENT FORM.

The difficulties experienced in the issue of coupon bonds of the first Liberty loan, to which were attached coupons covering interest to the final maturity date, together with the possibilities of conversions pursuant to the conversion privilege and the certainty that large numbers of coupon bonds would be exchanged for registered bonds, caused the Treasury, beginning with the 4 per cent bonds of the second Liberty loan, to issue coupon bonds in so-called temporary form—that is, with coupons attached covering interest for only two years or two years and a fraction. This procedure has enabled the department to make early delivery of coupon bonds subscribed for and has materially reduced the loss which would otherwise have been involved in the cancellation, upon conversion or exchange, of bonds with all coupons to maturity attached. The determining factor responsible for the issue of these temporary bonds, however, was the impossibility of printing bonds by the million of pieces for delivery within any reasonable period if such bonds were to have attached thereto coupons covering interest to the final maturity of the loan. The work of preparing coupon bonds of the several issues with coupons attached covering interest from the date of the last coupon originally attached to the date of final maturity with respect to each loan is proceeding satisfactorily at the Bureau of Engraving and Printing. It is expected that the $4\frac{1}{4}$ per cent bonds of the third Liberty loan will be available for delivery on and after March 15, 1920; that the $4\frac{1}{4}$ per cent bonds of the second Liberty loan converted will be available for delivery on and after May 15, 1920; that the $4\frac{1}{4}$ per cent bonds of the first Liberty loan converted will be available for delivery on and after June 15, 1920; that the $4\frac{1}{4}$ per cent bonds of the fourth Liberty loan will be available for delivery on and after October 15, 1920; and that the $4\frac{1}{4}$ per cent bonds of the first Liberty loan second converted will be available for delivery on and after December 15, 1920. The 4 per cent bonds of the first Liberty loan converted and the 4 per cent bonds of the second Liberty loan will be available for delivery on or about March 15, 1920, and every effort will be made to have the $4\frac{1}{4}$ per cent bonds of the first Liberty loan converted and of the second Liberty loan converted available for delivery on or about the same date.

In accordance with the terms of the so-called temporary bonds originally issued, such bonds are exchangeable, without charge by the United States, on and after the maturity date of the last coupons thereto attached for like bonds with all subsequent coupons attached. The department is proceeding with arrangements to

provide for these exchanges with the least possible inconvenience to the holders, and the public will be advised with respect thereto by Treasury Department circular prescribing full rules and regulations.

OFFICIAL TITLES OF LIBERTY BONDS AND VICTORY LIBERTY NOTES.

Recognizing the need for short titles for the various issues of Liberty bonds and Victory Liberty notes, the Treasury has given its official sanction to the use of certain abbreviated titles that are fairly descriptive of the respective loans. These will serve as a matter of convenience in connection with the daily transactions in these securities, and it is to be hoped that banks, newspapers and all others having occasion to refer to the bonds and notes will employ the officially approved short titles so that the people of the country may become so familiar with the names of the respective issues that they will readily identify them and thus be protected from misrepresentation with respect to any of the outstanding securities. Following are the official or formal titles of the several issues and the approved short titles thereof:

Formal titles.	Short titles.
First Liberty loan $3\frac{1}{2}$ per cent bonds of 1932-47.....	First $3\frac{1}{2}$'s.
First Liberty loan converted 4 per cent bonds of 1932-47.....	First 4's.
First Liberty loan converted $4\frac{1}{4}$ per cent bonds of 1932-47.....	First $4\frac{1}{4}$'s.
First Liberty loan second converted $4\frac{1}{4}$ per cent bonds of 1932-47.....	First Second $4\frac{1}{4}$'s.
Second Liberty loan 4 per cent bonds of 1927-42.....	Second 4's.
Second Liberty loan converted $4\frac{1}{4}$ per cent bonds of 1927-42....	Second $4\frac{1}{4}$'s.
Third Liberty loan $4\frac{1}{4}$ per cent bonds of 1928.....	Third $4\frac{1}{4}$'s.
Fourth Liberty loan $4\frac{1}{4}$ per cent bonds of 1933-38.....	Fourth $4\frac{1}{4}$'s.
Victory Liberty loan $4\frac{3}{8}$ per cent convertible gold notes of 1922-23.....	Victory $4\frac{3}{8}$'s.
Victory Liberty loan $3\frac{3}{8}$ per cent convertible gold notes of 1922-23.....	Victory $3\frac{3}{8}$'s.

AUTHORIZATIONS FOR ISSUES OF LIBERTY BONDS AND VICTORY NOTES.

The Secretary of the Treasury was authorized by the first, second, third, and fourth Liberty bond acts to issue bonds in amounts aggregating \$22,000,000,000. The authority has been exercised to the extent of \$16,977,335,850, leaving a balance of Liberty bonds which may be issued under existing law of \$5,022,664,150. By the Victory Liberty loan act the Secretary was authorized to issue notes of the United States to the aggregate amount of \$7,000,000,000. Deducting the amount of allotted subscriptions to the Victory Liberty loan, corrected to September 30, 1919, namely \$4,498,312,650, the balance of Victory notes which may be issued under existing law is approximately \$2,501,687,350. The following statement summarizes the authorizations for bonds and notes, the issues, and the amount of such securities that may be issued under existing law.

The first Liberty bond act (Apr. 24, 1917) authorized new issues of bonds not to exceed..... \$5, 000, 000, 000

The same act authorized the issue under the terms of such act of the unissued bonds previously authorized as follows:

For construction of Panama Canal (act Aug. 5, 1909), but including the unissued Panama Canal bonds authorized to be issued for the nitrate plant (act June 3, 1916) and for the Shipping Board (act Sept. 7, 1916), the amount of issued postal-savings bonds being deducted from the amount authorized (approximately).....	225, 000, 000
For extraordinary expenditures (act Mar. 3, 1917).....	100, 000, 000
For expediting naval construction (act Mar. 4, 1917).....	150, 000, 000
And an additional amount to provide for payment of loan of 1908-1918.....	63, 945, 460

Total authorization under first Liberty bond act.....	5, 538, 945, 460
First Liberty loan subscriptions allotted.....	2, 000, 000, 000
Balance bonds unissued under first Liberty bond act.....	3, 538, 945, 460

The second Liberty bond act (Sept. 24, 1917) authorized the issue of bonds (in addition to the \$2, 000, 000, 000 allotted under the first Liberty bond act), not to exceed in the aggregate..... 7, 538, 945, 460

And provided that of such sum \$3, 538, 945, 460 should be in lieu of unissued bonds authorized by the first Liberty bond act.

The third Liberty bond act (Apr. 4, 1918) increased the authority for the issue of bonds to..... 12, 000, 000, 000

The fourth Liberty bond act (July 9, 1918) further increased such authority to..... 20, 000, 000, 000

Issues of Liberty bonds under second Liberty bond act and under such act as amended:

Subscriptions allotted—

Second Liberty loan.....	\$3, 807, 891, 900
Third Liberty loan.....	4, 176, 516, 850
Fourth Liberty loan.....	6, 992, 927, 100
	<u>14, 977, 335, 850</u>

Balance authority under existing law for issues of Liberty bonds.....	5, 022, 664, 150
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Authorization of issues of Victory notes.

The Victory Liberty loan act (approved Mar. 3, 1919) authorized the issue of notes of the United States not to exceed in the aggregate.. \$7, 000, 000, 000

Issues of Victory notes: Victory Liberty loan, allotted subscriptions, corrected to Sept. 30, 1919..... 4, 498, 312, 650

Balance authority under existing law for issues of notes.....	2, 501, 687, 350
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RECAPITULATION.

Under existing authority of law there may be issued:

Bonds.....	5, 022, 664, 150
Notes.....	2, 501, 687, 350
Total.....	<u>7, 524, 351, 500</u>

ILLEGITIMATE TRAFFIC IN GOVERNMENT OBLIGATIONS.

The Treasury has been much concerned during the past year over the illegitimate and dishonest traffic in Liberty bonds and war-savings certificates and stamps. A number of unscrupulous and unpatriotic persons, by advertisements in the daily press and through personal solicitation in letters and otherwise, have purchased these securities from the owners at prices far below their market price in the case of bonds, and in the case of war-savings certificates considerably below their redemption value, and have redeemed such certificates at a profit by cashing them at post offices. The Treasury has used every means to frustrate the operations of such swindlers and has urged owners of Government securities, whenever it becomes necessary for them to part with them, to deal with reliable banks, trust companies, and others of dependable reputation, and in case of war-savings certificates to go direct to a postmaster, the only official redeeming agency.

The Treasury, with the cooperation of the Post Office Department, has also taken various steps throughout the year to meet the situation with respect to war-saving certificates and stamps. These certificates, by the terms of their issue, are not transferable. Under date of January 23, 1919, the Post Office Department issued instructions to postmasters throughout the country directing them to refuse to pay any war-savings certificates where it was apparent that changes had been made in the name of the original owner or where the certificate was presented by anyone known to be publicly buying or offering to buy war-savings stamps or certificates from the owners, unless positive evidence was submitted that the certificate presented was originally issued to the person then demanding payment.

ISSUES OF FRAUDULENT AND WORTHLESS SECURITIES.

The attention of the Congress again is invited to the necessity of enacting legislation to protect the people of the United States from grave injury growing out of the issue of securities of doubtful worth and in many cases of fraudulent character. Unscrupulous promoters, moreover, have tempted patriotic subscribers to the war obligations of the Government, particularly those who were unaccustomed to investments, to exchange Liberty bonds for their worthless stocks, causing financial loss to innocent victims and prejudicing the national finances by the resultant sale on the market of Government securities by those who have thus obtained possession of them.

The Capital Issues Committee has reported upon the subject somewhat in detail. During the war the committee was unable to reach the unpatriotic or dishonest stock vendor because of lack of power under the law to compel submission to its jurisdiction. The experience of the committee, however, has been laid before the Congress and the

Treasury has presented to the House Ways and Means Committee and to the Senate Committee on Finance a bill proposed by the Capital Issues Committee and with the general purposes of which this department is in accord. The Secretary's letter and the committee's bill are attached hereto. The importance of the enactment of legislation along these lines was emphasized by the President in his address to the Congress, August 8, 1919, on "The Cost of Living" in the following words:

May I not add that there is a bill now pending before the Congress which, if passed, would do much to stop speculation and to prevent the fraudulent methods of promotion by which our people are annually fleeced of many millions of hard-earned money? I refer to the measure proposed by the Capital Issues Committee for the control of security issues. It is a measure formulated by men who know the actual conditions of business and its adoption would serve a great and beneficent purpose.

It may be that action by the Congress alone will not suffice to suppress the evil effectually and that the problem will require supplementary legislation by the several States to reach agents who rely upon personal conversations and solicitations without the use of the mails or any other governmental agency of the United States. The Treasury respectfully urges the Congress to give consideration to this important matter, and it is earnestly hoped that such action as is necessary will be taken by the States in coordination with legislation by the Congress.

TAX EXEMPTIONS OF LIBERTY BONDS AND VICTORY NOTES.

The $4\frac{1}{2}$ per cent Victory notes are exempt, both as to principal and interest, from all taxation now or hereafter imposed by the United States, any State, or any of the possessions of the United States, or by any local taxing authority, except (a) estate or inheritance taxes, and (b) graduated additional income taxes, commonly known as surtaxes, and excess-profits and war-profits taxes, now or hereafter imposed by the United States upon the income or profits of individuals, partnerships, associations, or corporations. The $3\frac{1}{4}$ per cent Victory notes are exempt, both as to principal and interest, from all taxation (except estate or inheritance taxes) now or hereafter imposed by the United States, any State, or any of the possessions of the United States, or by any local taxing authority.

The Victory Liberty loan act also provided, in section 2, for certain further exemptions of Liberty bonds from Federal income surtaxes and profits taxes. These exemptions were in addition to the exemptions conferred by the second Liberty bond act and the supplement to the second Liberty bond act, and were designed to stabilize further the market prices of the outstanding Liberty bonds. Section 2 (a) of the Victory Liberty loan act granted an exemption up to \$30,000 in the aggregate of first Liberty loan converted 4 per cent

bonds, first Liberty loan converted $4\frac{1}{4}$ per cent bonds, first Liberty loan second converted $4\frac{1}{4}$ per cent bonds, second Liberty loan 4 per cent bonds, second Liberty loan converted $4\frac{1}{4}$ per cent bonds, third Liberty loan $4\frac{1}{4}$ per cent bonds, and fourth Liberty loan $4\frac{1}{4}$ per cent bonds, as to the interest received on and after January 1, 1919, until the expiration of five years after the termination of the war. This exemption was not made conditional upon subscription to Victory notes. Section 2 (b) granted a further exemption up to \$20,000 in the aggregate of such 4 per cent and $4\frac{1}{4}$ per cent Liberty bonds as to the interest received on and after January 1, 1919, this exemption being conditional upon original subscription to and continued holding at the date of the tax return of one-third as many notes of the Victory Liberty loan, and extending through the life of such notes of the Victory Liberty loan.

Accordingly the tax exemptions of Liberty bonds and Victory notes may now be summarized as follows:

I. Four per cent and $4\frac{1}{4}$ per cent bonds and $4\frac{1}{4}$ per cent Victory notes are exempt from all Federal, State, and local taxation, except (a) estate or inheritance taxes, and (b) Federal income surtaxes and profits taxes, as follows:

(1) First Liberty loan converted 4 per cent bonds of 1932-1947 (first 4's); (2) first Liberty loan converted $4\frac{1}{4}$ per cent bonds of 1932-1947 (first $4\frac{1}{4}$'s); (3) first Liberty loan second converted $4\frac{1}{4}$ per cent bonds of 1932-1947 (first second $4\frac{1}{4}$'s); (4) second Liberty loan 4 per cent bonds of 1927-1942 (second 4's); (5) second Liberty loan converted $4\frac{1}{4}$ per cent bonds of 1927-1942 (second $4\frac{1}{4}$'s); (6) third Liberty loan $4\frac{1}{4}$ per cent bonds of 1928 (third $4\frac{1}{4}$'s); (7) fourth Liberty loan $4\frac{1}{4}$ per cent bonds of 1933-1938 (fourth $4\frac{1}{4}$'s); and (8) Victory Liberty loan $4\frac{1}{4}$ per cent convertible gold notes of 1922-1923 ($4\frac{1}{4}$ per cent Victory notes) are exempt, both as to principal and interest, from all taxation now or hereafter imposed by the United States, any State, or any of the possessions of the United States, or by any local taxing authority, except (a) estate or inheritance taxes, and (b) graduated additional income taxes, commonly known as surtaxes, and excess-profits and war-profits taxes, now or hereafter imposed by the United States upon the income or profits of individuals, partnerships, associations, or corporations.

II. Four per cent and $4\frac{1}{4}$ per cent bonds are entitled to limited exemptions from Federal income surtaxes and profits taxes, as follows:

Four per cent and $4\frac{1}{4}$ per cent Liberty bonds (but not $4\frac{1}{4}$ per cent Victory notes) are entitled to certain limited exemptions from graduated additional income taxes, commonly known as surtaxes, and excess-profits and war-profits taxes, now or hereafter imposed by the United States, upon the income or profits of individuals, partnerships, associations, or corporations, in respect to the interest on principal amounts thereof, as follows:

1. Five thousand dollars in the aggregate of first 4's, first $4\frac{1}{4}$'s, first second $4\frac{1}{4}$'s, second 4's and $4\frac{1}{4}$'s, third $4\frac{1}{4}$'s, fourth $4\frac{1}{4}$'s, Treasury certificates, and war-savings certificates.

2. Thirty thousand dollars of first second $4\frac{1}{4}$'s, until the expiration of two years after the termination of the war.

3. Thirty thousand dollars of fourth $4\frac{1}{4}$'s, until the expiration of two years after the termination of the war.

4. Thirty thousand dollars in the aggregate of first 4's, first $4\frac{1}{4}$'s, first second $4\frac{1}{4}$'s, second 4's and $4\frac{1}{4}$'s, third $4\frac{1}{4}$'s, and fourth $4\frac{1}{4}$'s, as to the interest received on and after January 1, 1919, until the expiration of five years after the termination of the war.

5. Forty-five thousand dollars in the aggregate of first 4's, first 4½'s, second 4's and 4½'s, and third 4½'s, as to the interest received after January 1, 1918, until the expiration of two years after the termination of the war; this exemption conditional on original subscription to, and continued holding at the date of the tax return of, two-thirds as many bonds of the fourth Liberty loan.

6. Twenty thousand dollars in the aggregate of first 4's, first 4½'s, first second 4½'s, second 4's and 4½'s, third 4½'s, and fourth 4½'s, as to the interest received on and after January 1, 1919; this exemption conditional upon original subscription to, and continued holding at the date of the tax return of, one-third as many notes of the Victory Liberty loan, and extending through the life of such notes of the Victory Liberty loan.

One hundred and sixty thousand dollars total possible exemptions from Federal income surtaxes and profits taxes, subject to conditions above summarized.

III. Three and one-half per cent bonds and 3½ per cent notes are exempt from all Federal, State, and local taxation, except estate or inheritance taxes, as follows:

(1) First Liberty loan 3½ per cent bonds of 1932-1947, and (2) Victory Liberty loan 3½ per cent convertible gold notes of 1922-1923, are exempt, both as to principal and interest, from all taxation (except estate or inheritance taxes) now or hereafter imposed by the United States, any State, or any of the possessions of the United States, or by any local taxing authority.

In this connection I believe it my duty to direct your attention to the need of simplification of the limited exemptions from surtaxes and profits taxes, summarized in paragraph II above, which were conferred upon the holders of Liberty bonds by legislation enacted from time to time during the period of the war.

Of these exemptions, exemption No. 1 continues throughout the life of the various securities concerned and is not susceptible of change or consolidation with any other exemption. Exemptions No. 3 and No. 5 both continue until the expiration of two years after the termination of the war. No. 3 is unconditional, but No. 5 is conditioned on original subscription to and continued holding at the date of the tax return of two-thirds as many bonds of the fourth Liberty loan. I suggest, accordingly, that No. 3 and No. 5 be consolidated, and inasmuch as the condition which was imposed at the time exemption No. 5 was conferred has served its purpose, that that condition may now be removed in the interest of simplicity of administration, and also for the benefit of the market for Liberty bonds. Exemption No. 2 is confined to one issue of bonds which aggregates only \$3,492,050, and it can not be removed, nor be consolidated with other exemptions without grave loss to the revenue. Exemptions No. 4 and No. 6 continue, the one until the expiration of five years after the termination of the war and the other through the life of the notes of the Victory Liberty loan. No. 4 is unconditional, but No. 6 is conditioned on original subscription to and continued holding at the date of the tax return of one-third as many notes of the Victory Liberty loan. I suggest that these two exemptions be combined and that, for the reasons above given with relation to exemption No. 5, the condition be removed. This will extend somewhat the life of the \$20,000 ex-

emption, but I believe the simplicity of administration and the benefit to the market for Liberty bonds will justify the course proposed.

The only objection to these simplified arrangements which occurs to the Treasury is that they may confer upon holders of bonds who did not subscribe or hold bonds or notes as required by the acts of Congress certain exemptions from taxation which were conferred upon original subscribers. On the other hand, they take away no right which any holder has and in so far as they confer rights upon those not now holders, they will in the end benefit original subscribers who are still holders by improving the market value of their bonds or notes. It is impossible to present any accurate calculation of the consequences to the Treasury of the amendments of the law proposed. I do not hesitate, however, to express my confident judgment that the loss in revenue will be relatively slight and that the gain to the Treasury which will result from the increased attractiveness of the taxable issues of the Liberty loans and the consequent benefit to the Government's credit, as well as the simplicity of administration, will amply compensate the Treasury for that slight loss.

These simplified exemptions could be established by a statutory provision reading substantially as follows:

That in addition to the exemptions provided in section 7 of the second Liberty bond act and in subdivision (3) of section 1 of the supplement to second Liberty bond act, 4 per cent and 4½ per cent Liberty bonds shall be exempt from graduated additional income taxes, commonly known as surtaxes, and excess-profits and war-profits taxes, now or hereafter imposed by the United States, upon the income or profits of individuals, partnerships, associations, or corporations, in respect to the interest on aggregate principal amounts thereof as follows: \$125,000 aggregate principal amount thereof after January 1, 1920, and until the expiration of two years after the date of the termination of the war between the United States and the German Government, and \$50,000 aggregate principal amount thereof after the expiration of two years and until the expiration of five years after the date of the termination of the war between the United States and the German Government. The exemptions hereby conferred are not subject to the conditions and limitations respectively imposed in subdivisions (1) and (2) of section 1 of the supplement to second Liberty bond act and in section 2 of the Victory Liberty loan act, and are in lieu of and not in addition to the exemptions therein contained.

BOND AND NOTE DESIGNS.

In the preparation of the Liberty bonds and the Victory notes, involving the issuance of so many millions of pieces of war securities, every effort has been made to protect the Treasury and the public and to circumvent counterfeiting and denominational raising. The Government's established high standards of engraving and plate printing have been maintained. Color work has been introduced when appropriate and the bonds and notes have been printed on the distinctive bank-note paper adopted by the Treasury for currency issues, in which rows of red and blue silk fiber are woven during the

process of manufacture. Profiting by experience of the past with respect to currency issues, a multiplicity of designs has been avoided. Distinctive portraits have been assigned to each denomination for all issues, and following the same principle the backs of each denomination are printed in a uniform color for all issues. These distinctive features will greatly serve in preventing denominational raising. With such a vast amount of war securities outstanding, it is important that the people become thoroughly familiar with the characteristics of each issue in order that they may not be imposed upon by the unscrupulous. In general, the distinctive features appertaining to all issues of Liberty bonds and Victory notes are as follows:

Denomination.	Portrait on face of bonds.	Color of backs of bonds and coupons.
\$50	Jefferson.....	Brown.
100	Jackson.....	Orange.
500	Washington.....	Dark blue.
1,000	Lincoln.....	Green.
5,000	Monroe.....	Red.
10,000	Cleveland.....	Purple.
50,000	McKinley.....	Olive.
100,000	Grant.....	Light blue.

One exception occurs: the backs of the \$10,000 denomination of the first 3½'s, registered, are printed in brown.

CURRENCY DESIGNS.

Following the policy pursued with respect to uniform denominational designs for Liberty bonds and Victory notes, the Treasury is now undertaking to adopt a distinctive characteristic for each denomination of all forms of currency in circulation. Instructions have been issued to the Bureau of Engraving and Printing to prepare a uniform portrait that will represent each denomination of all issues of paper money. As Federal reserve notes and Federal reserve bank notes are now largely in circulation, it has been decided to adopt for all forms of currency the portraits that appear on those notes. The bureau is engaged on the work and the changes will be effected as soon as possible. This standardization will serve as a safeguard and protection against note raising, as well as in the interest of economy. It will assist bankers, business men, and the people generally in detecting attempted counterfeits, one of the most fruitful causes of which has been the absence of distinctive denominational features in the currency.

One of the greatest dangers to the Treasury and to the public in connection with the question of counterfeiting has been the multiplicity of designs of our various forms of currency. The question of revision of currency designs has been under consideration by the Treasury for many years, but it has been deemed important to take

this particular step with respect to denominational distinction without awaiting deliberation on the general subject.

The denominational portraits appearing on Federal reserve notes and Federal reserve bank notes, and which now have been prescribed for future issues of all kinds of currency, are as follows:

Denomina- tions.	Portrait.	Denomina- tions.	Portrait.
\$1	Washington.	\$100	Franklin.
2	Jefferson.	500	Marshall.
5	Lincoln.	1,000	Hamilton.
10	Jackson.	5,000	Madison.
20	Cleveland.	10,000	Chase.
50	Grant.		

THE FEDERAL RESERVE SYSTEM.

During the past year the Federal reserve system has continued to render important service by assisting the Government in its war finance operations and by enabling the banks to support the efforts of the Treasury without neglecting the interests of commerce and industry.

Between October 25, 1918, and October 31, 1919, the total of discounted bills held by the Federal reserve banks has grown from \$1,546,164,000 to \$2,128,547,000. Of the latter total, \$1,681,082,000 is represented by paper secured by Government war obligations, as against \$1,092,417,000 on the earlier date. During the period under review the Federal reserve banks, as before, very properly abstained from directly investing their funds in Government war securities. The bulk of Government securities held at present by the Federal reserve banks consists of United States bonds and 1-year 2 per cent certificates to secure Federal reserve bank-note circulation. Holdings of Government war securities proper represent almost altogether temporary purchases of Liberty bonds, Victory notes, and Treasury certificates to accommodate member and nonmember banks. No material changes in members' reserve deposits or in net deposits of the Federal reserve banks have occurred during the year, increases in these items being due largely to the accession of new members.

Federal reserve note circulation stood on October 31, 1919, at \$2,752,876,000, only slightly below the highest figure on record (\$2,753,457,000 reported for October 24, 1919), the corresponding amount for October 25, 1918, being \$2,507,912,000. The large amount of notes in circulation on both dates mentioned is due in part to the seasonal requirements for currency during the crop-moving period, while the greater amount this year compared with the preceding year reflects largely the higher price level prevailing

at the present time. During the period the Federal reserve banks' aggregate liabilities on Federal reserve bank notes in circulation increased from \$58,859,000 to \$254,933,000, this increase corresponding approximately to the amount of silver certificates of small denominations retired in accordance with the provisions of the act of April 23, 1918, known as the Pittman Act.

Gold reserves of the Federal reserve banks, which were \$2,045,132,000 on October 25, 1918, continued to increase, largely through deposits by the Treasury, and stood at \$2,201,804,000 on June 6, 1919, just before the removal by the Government of the embargo on gold exports on June 9. After that date an almost continuous decline in gold reserves is noted for a period of three months deposits by the Treasury not being sufficient to offset withdrawals for export. During the months of September and October gains in gold reserves were caused through the acquisition by the Federal reserve banks of gold received in payment for food sold by the United States Grain Corporation to the German Government. On October 31, total gold reserves were \$2,138,000,000, or about 93 millions more than on October 25, 1918.

Owing largely to the seasonal character of Government income and profits tax collections, great variation is shown in the amounts of balances carried by the Federal reserve banks on Government account, the maximum amounts occurring on the dates when large tax payments fell due. During the period under review the total Government balances ranged between 26 millions on June 6, 1919, and 286 millions on March 21, 1919, the Friday following the date when the first installment of income and excess-profits taxes fell due. The average of these balances for the period covered was 126 millions, an average somewhat lower than the corresponding average for the calendar year 1918.

Discount rates of the Federal reserve banks show but little change during the fiscal year and whatever changes occurred were parallel to changes in the rates charged on war paper. The rate on 15-day paper secured by United States war obligations early in 1918 was raised to 4 per cent, and this was the ruling rate at which the bulk of the discounts was made by most of the Federal reserve banks. The 90-day rate on war paper was maintained at $4\frac{1}{2}$ per cent, except that temporarily a 4 per cent rate was adopted to encourage the financing by the member banks of the fourth Liberty loan. Rates on ordinary commercial paper, as a rule, were fixed one-fourth to three-fourths per cent higher than the corresponding rates on war paper, with the result that since the middle of December, 1918, the share of war paper in the banks' holdings of discounted bills never fell much below 80 per cent.

A statement showing the changes for the period, November 1, 1918, to June 30, 1919, in the loans and discounts of national banks, their holdings of Government securities and their gross deposits follows:

[In thousands of dollars.]

Date.	Loans and discounts.	Government securities.	Gross deposits.
Nov. 1, 1918.....	10,096,940	3,156,312	15,051,473
Dec. 31, 1918.....	9,918,294	2,949,878	15,423,081
Mar. 4, 1919.....	9,691,187	3,681,607	15,299,807
May 12, 1919.....	9,904,821	4,028,140	15,903,796
June 30, 1919.....	10,574,838	3,171,912	15,924,865

Loans and discounts showed relatively small changes between November 1, 1918, and May 12, 1919, but increased by over 650 millions between the latter date and June 30. On the other hand, Government security holdings which had gone up from 3,156 millions on November 1, 1918, to 4,028 millions on May 12, declined to 3,172 millions on June 30, as the result largely of the redemption of Treasury certificates. Gross deposits, with the exception of the period between the last of December, 1918, and March, 1919, show a continuous growth, the total on June 30 last being about 874 millions in excess of the November, 1918, total.

WAR FINANCE CORPORATION.

With the signing of the armistice there was necessarily a narrowing of the scope of the operations of the War Finance Corporation because of the limitation of the law which restricted the advances of the corporation to "purposes necessary and contributory to the war." The corporation previously had entered into a number of engagements, however, which it was necessary to carry out in accordance with the terms agreed upon, as borrowers had made their plans in good faith, relying upon the assistance of the corporation. Among such advances were cattle loans in drouth-stricken sections of the country for the purpose of preserving the breeding herds. These loans were, as previous ones of the same character, of very great service in conserving the meat supply of the Nation.

While considerable amounts thus were advanced, a large amount of money was returned to the corporation during the year in repayment of advances, and with very few exceptions the emergency funds provided by the Government have been promptly repaid on maturity of the loans.

In line with the recommendations of the Treasury, the Congress extended the functions of the corporation with respect to financing foreign trade by the following amendment to the War Finance Corporation Act, which was incorporated in the Victory Loan act:

SEC. 21. (a) That the corporation shall be empowered and authorized, in order to promote commerce with foreign nations through the extension of credits, to make

advances upon such terms, not inconsistent with the provisions of this section, as it may prescribe, for periods not exceeding five years from the respective dates of such advances:

(1) To any person, firm, corporation, or association engaged in the business in the United States of exporting therefrom domestic products to foreign countries, if such person, firm, corporation, or association is, in the opinion of the board of directors of the corporation, unable to obtain funds upon reasonable terms through banking channels. Any such advance shall be made only for the purpose of assisting in the exportation of such products, and shall be limited in amount to not more than the contract price therefor, including insurance and carrying or transportation charges to the foreign point of destination if and to the extent that such insurance and carrying or transportation charges are payable in the United States by such exporter to domestic insurers and carriers. The rate of interest charged on any such advance shall not be less than 1 per centum per annum in excess of the rate of discount for ninety-day commercial paper prevailing at the time of such advance at the Federal reserve bank of the district in which the borrower is located; and

(2) To any bank, banker, or trust company in the United States which after this section takes effect makes an advance to any such person, firm, corporation, or association for the purpose of assisting in the exportation of such products. Any such advance shall not exceed the amount remaining unpaid of the advances made by such bank, banker, or trust company to such person, firm, corporation, or association for such purpose.

(b) The aggregate of the advances made by the corporation under this section remaining unpaid shall never at any time exceed the sum of \$1,000,000,000.

(c) Notwithstanding the limitation of section 1 the advances provided for by this section may be made until the expiration of one year after the termination of the war between the United States and the German Government as fixed by proclamation of the President. Any such advance made by the corporation shall be made upon the promissory note or notes of the borrower, with full and adequate security in each instance by indorsement, guaranty, or otherwise. The corporation shall retain power to require additional security at any time. The corporation in its discretion may upon like security extend the time of payment of any such advance through renewals, the substitution of new obligations, or otherwise, but the time for the payment of any such advance shall not be extended beyond five years from the date on which it was originally made.

During the first few months after the passage of the above amendment, loans made by the Treasury to foreign governments, the authorization of the War Department to sell its surplus stock on credit, the authority of the Food Administration to sell on credit, and special measures passed by the Congress for the relief of European nations sufficed to maintain an exceptionally high level of exports, but the time has now arrived when this new authority conferred upon the War Finance Corporation is beginning to be used in the way contemplated by the law.

Failure of the appropriation for the Railroad Administration created a sudden emergency in which the War Finance Corporation was able to be of great assistance. It was felt by the directors that this aid came well within the powers of the corporation in view of the fact that the maintenance of our transportation system for the purpose of keeping up a steady flow of supplies to American troops still in Europe and for the purpose of facilitating demobilization constituted an essential part of operations necessary and contributory to the war.

In March, 1919, the directors, facing the large requirements of the railroads, decided to issue \$200,000,000 of 1-year 5 per cent bonds of the corporation. This issue was quickly taken just prior to the issue of the Victory loan and ample funds for any emergency were thereby provided. In connection with the financing of railroad requirements, the War Finance Corporation advanced to the Director General, on proper security, \$50,000,000, and to the railroads on security of certificates of indebtedness of the Director General of Railroads \$65,094,830. The action of the War Finance Corporation not only furnished money in the sums mentioned, but made feasible the prompt and patriotic cooperation of the bankers of the country in assisting the railroads. On the assembling of the Congress, the appropriation for the railroads was promptly passed and both the Railroad Administration and the railroads repaid these emergency loans. The corporation still has outstanding loans to railroads to the extent of \$70,358,210.

The corporation has continued its function as a dealer in Government securities under section 11 of the act, and has been of great service in stabilizing the Government bond market.

After the signing of the armistice, numerous changes in the organization of the War Finance Corporation occurred. W. P. G. Harding resigned as managing director, continuing as director, and was succeeded as managing director by Eugene Meyer, jr. Clifford M. Leonard, who served as director during the war period, found it necessary on account of his health and business to resign. Sherman Allen, secretary and treasurer, resigned to enter private business, and was succeeded by R. R. Burklin. The general counsel of the corporation, George S. Franklin and Samuel W. Fordyce, jr., as well as associate counsel Frank M. Peters and Morton G. Bogue, were compelled to give up their public service to resume their private activities. M. C. Elliott was elected consulting counsel and Louis B. Wehle general counsel.

The subjoined statement shows the condition of the corporation as of November 15, 1919:

ASSETS.				
Due from depositaries:				
Treasurer of the United States.....				\$13,467,262.56
Cattle loan agency.....				1,466.41
				\$13,468,728.97
Advances under the provisions of the act:				
	Total advances.	Total repayments.	Balance outstanding.	Balance outstanding.
Section 7, paragraph 1.....	\$2,997,202.61	\$2,596,410.12		\$400,792.49
Section 7, paragraph 2.....	1,712,575.00	437,125.00		1,275,450.00
Section 8.....	550,000.00	550,000.00		
Section 9:				
Railroads.....	204,794,520.00	134,436,310.00	\$70,358,210.00	
Public utilities.....	39,661,400.00	17,124,767.85	22,536,632.15	
Warehouse receipts.....	25,211,500.00	25,211,500.00		
Industrial loans.....	23,776,152.00	22,737,500.00	1,038,652.00	
Cattle loans.....	7,779,826.13	5,074,915.28	2,704,910.85	96,638,405.00
Total.....	306,483,175.74	208,168,528.25		98,314,647.49
United States bonds and Treasury certificates of indebtedness.....				482,544,097.70
United States bonds purchased, not yet delivered.....				4,208,289.29
Public utility bonds.....				58,400.00
Accrued interest receivable on loans.....				1,174,554.00
Furniture and equipment.....				9,242.49
Total assets.....				599,777,939.94

LIABILITIES.

Capital stock paid in (authorized \$500,000,000).....		\$455,000,000.00
1-year 5 per cent gold bonds, Series A.....	\$200,000,000.00	
Less amount repurchased by corporation.....	67,807,000.00	
		132,193,000.00
Interest and sundry profits.....	17,830,069.86	
Less:		
Interest paid on 1-year 5 per cent gold bonds of the War Finance Corporation.....	\$3,873,171.40	
Accrued interest paid on United States Government obligations purchased.....	888,761.03	
Expenses of issue of 5 per cent gold bonds of the War Finance Corporation.....	233,079.23	
Administrative expenses since organization.....	250,118.26	
		5,245,129.92
Net interest and sundry profits (collected).....		12,584,939.94
Total liabilities.....		599,777,939.94

From the above statement it will be seen that the War Finance Corporation holds large amounts of the various issues of Liberty bonds as well as considerable amounts of Treasury certificates. Liquidation of the Treasury certificates at maturity and the sale of a large part of the holdings of bonds to the Treasury for its bond purchase fund will enable the corporation to liquidate its bonded indebtedness due April 1, 1920, and also to provide funds to a considerable extent for advances to foreign trade.

CAPITAL ISSUES COMMITTEE.

The Capital Issues Committee completed its work shortly after the signing of the armistice and suspended active operations on December 31, 1918. The committee rendered its final report to the Congress on February 28, 1919, and was formally dissolved by the President on August 30, 1919.

From the date of its organization on May 17, 1918, to the close of its active operations on December 31, 1918, the committee received and passed upon 3,309 applications involving new securities of an aggregate value of \$3,777,313,000. The total amount disapproved by the committee was \$917,133,000.

In passing upon issues of securities for public and private enterprises entirely from the standpoint of the national interest, the committee performed a most important function during the war and served an imperative purpose in conserving investment capital, labor, and material for the use of the Government and essential industries. The committee operated as the logical corollary of the War Finance Corporation.

The proclamation of the President dissolving the committee on August 30, 1919, and placing its records in the custody of the Federal Trade Commission was as follows:

BY THE PRESIDENT OF THE UNITED STATES OF AMERICA—A PROCLAMATION.

Whereas Congress on April 5, 1918, enacted a law known as "The war finance corporation act;" and

Whereas, under section 206 of said act, it is provided that the President may at any time by proclamation declare that the title relating to the capital issues committee is no longer necessary and that thereupon it shall cease to be in effect:

Now therefore, I, Woodrow Wilson, President of the United States, by virtue of the authority in me vested, do hereby proclaim and declare that title 2 of said war finance corporation act, relating to the capital issues committee, is no longer necessary, and I further direct that the committee shall close up its affairs, and that all the records, including letters, correspondence, and testimony in the possession of said committee be turned over to the Federal Trade Commission.

In witness whereof I have hereunto set my hand and caused the seal of the United States to be affixed.

Done this 30th day of August, in the year of our Lord 1919, and of the independence of the United States of America the one hundred and forty-fourth.

WOODROW WILSON.

By the President:

ROBERT LANSING,

Secretary of State.

GOLD.

The stock of gold money in the United States, including coin and bullion, was \$2,872,525,066 on November 1, 1919, a decrease of \$207,259,700 as compared with November 1, 1918, and an increase of \$985,254,402 as compared with August 1, 1914, or at the beginning of the war in Europe. About one-third of the world's monetary stock of gold is estimated to be held by the United States.

After the termination of the embargo on the export movement of gold on June 9, 1919, there were moderate withdrawals, which naturally reduced the monetary stock. The amount of gold money in the country on June 1, 1919, and on the first day of each succeeding month until November was as follows:

June 1, 1919.....	\$3,092,037,699	Sept. 1, 1919.....	\$2,944,727,731
July 1, 1919.....	3,026,591,090	Oct. 1, 1919.....	2,905,726,555
Aug. 1, 1919.....	2,989,548,109	Nov. 1, 1919.....	2,872,525,066

The rising cost of labor and material has rendered gold mining, not only in this country, but in all parts of the world, progressively less and less profitable during the past two years, with the result of a decreased output of gold in all parts of the world. There resulted considerable public discussion as to what steps, if any, might wisely be taken to relieve this situation. On November 2, 1918, my predecessor appointed a committee, consisting of Albert Strauss, vice-governor of the Federal Reserve Board, chairman; Edwin F. Gay, dean of the graduate school of business administration, Harvard University; Raymond T. Baker, Director of the Mint; Emmet D. Boyle, governor of Nevada; and Pope Yeatman, mining engineer, to consider and report on the subject. The conclusions reached by the committee commend themselves to me as sound and meet with my entire approval.

SILVER.

The conversion of silver dollars for use as bullion continued virtually throughout the fiscal year, the work having been completed on May 6, 1919, when the Secretary announced that he did not con-

template any further sales of silver under the act of April 23, 1918, generally known as the Pittman Act, except to the Director of the Mint.

Over 191,000,000 standard silver dollars were melted during the year. That amount, together with the dollars melted in the preceding fiscal year, enabled the Treasury to complete the arrangement entered into in May, 1918, with the British Government for the shipment to India of 200,000,000 fine ounces of silver resulting from the melting of silver dollars under the authority of the Pittman Act.

The following tables show various operations under that act from the date of its passage to October 31, 1919:

TABLE I.—*Silver dollars melted.*

Dollars melted (whereof \$3,177,554 represented dollars in Treasury and the balance was made available by the retirement of silver certificates)	\$260, 121, 554
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TABLE II.—*Silver certificates withdrawn from circulation and canceled.*

Denominations.	Amount net.
\$1	\$112, 718, 265
\$2	35, 624, 260
\$5	92, 960, 115
\$10	6, 956, 820
\$20	6, 396, 340
\$50	2, 262, 400
\$100	24, 300
\$500	1, 500
Total face value	256, 944, 000

TABLE III.—*Federal reserve bank notes issued Apr. 30, 1918, to Oct. 31, 1919.*

	Net issue.
\$1	\$174, 241, 436
\$2	46, 624, 364
\$5	34, 170, 435
\$10	1, 608, 910
\$20	1, 254, 700
Total	257, 899, 845
Less notes redeemed but not assorted by denominations	1, 656, 000
Notes outstanding October 31, 1919	256, 243, 845

The Federal reserve bank notes which have been issued, as stated in the above table, are secured as follows:

United States loan of 1925, 4 per cent.	\$1, 768, 000
United States consols of 1930, 2 per cent.	4, 523, 100
United States Panama loan 1916, 2 per cent.	130, 300
United States Panama loan 1918, 2 per cent.	258, 000
Special certificates of indebtedness, 2 per cent.	255, 475, 000
Total	262, 154, 400

The announcement of May 6, 1919, coupled with the removal on that day of all restrictions on the export of silver, more fully discussed elsewhere in this report under the heading "The International Financial Situation," had the effect of freeing the silver market from the control of war measures. The market price of silver in the New York market has since fluctuated as follows:

Maximum and minimum prices of silver, by months, since May 6, 1919.

	Maximum.	Minimum.		Maximum.	Minimum.
May.....	\$1.215	\$1.0125	August.....	\$1.1675	\$1.0825
June.....	1.1425	1.085	September.....	1.2125	1.12
July.....	1.09375	1.035	October.....	1.2575	1.1725

PUBLIC MONEYS AND SPECIAL DEPOSITARIES.

The Treasury continued throughout the year the policy of depositing proceeds from Liberty loan subscriptions and purchases of certificates of indebtedness in incorporated banks and trust companies designated by the Secretary as special depositaries for the purpose. Any incorporated bank or trust company is eligible for such special designation in accordance with the provisions of Department Circular No. 92, as amended and supplemented, April 17, 1919 (Exhibit 71, page 432). The entire receipts from Liberty loan subscriptions and certificate sales during the fiscal year 1919 were deposited with special depositaries, the Federal reserve banks, branch Federal reserve banks, and the Treasurer of the United States.

At the beginning of the fiscal year 1919 there were 6,510 special depositaries and at the close of the year there were 9,550, of which 4,511 were national banks and 5,039 State banks and trust companies. Both national and State banks were designated as such depositaries in every State in the Union.

The amount of Government deposits in these depositaries on June 30, 1919, was \$905,397,000, and on October 31, 1919, \$422,776,000. These special deposits, like deposits in the regular depositaries for Government funds, paid the Treasury interest at the rate of 2 per cent per annum. The amount of interest received from such depositaries for the fiscal year 1919 was \$20,996,202.36, while the amount of interest received from this source from the date of the creation of the special depositaries in the early part of the war to June 30, 1919, was \$31,921,081.82, as shown by the following table:

Interest collected to June 30, 1919, by Federal reserve districts, on deposits in special depositories on account of sales of Liberty bonds, Victory notes, and certificates of indebtedness and income and profits tax payments under acts of Apr. 24, 1917, Sept. 24, 1917, Apr. 4, 1918, Sept. 24, 1918, July 9, 1918, and Mar. 3, 1919.

Federal reserve district.	April 24 to June 30, 1917.	July 1 to Dec. 31, 1917.	Jan. 1 to June 30, 1918.	July 1 to Dec. 31, 1918.	Jan. 1 to June 30, 1919.	Total.
Boston.....	\$5,340.47	\$495,044.28	\$757,345.98	\$1,138,915.47	\$733,867.20	\$3,130,513.40
New York.....	338,480.60	2,418,335.72	2,486,301.63	6,720,162.97	2,968,858.77	14,932,139.69
Philadelphia.....	1,044.64	200,276.04	557,068.79	1,059,668.15	596,436.23	2,411,493.85
Cleveland.....		290,482.56	803,219.84	872,392.10	696,750.48	2,662,844.98
Richmond.....		81,252.94	128,860.72	109,503.64	242,735.18	562,352.48
Atlanta.....	252.06	28,189.21	96,086.74	144,165.99	203,550.98	472,244.98
Chicago.....	9,023.53	300,428.59	658,048.19	974,334.63	1,107,399.81	3,049,234.75
St. Louis.....		56,412.34	268,726.24	403,488.76	369,776.91	1,098,404.25
Minneapolis.....		32,520.68	168,309.21	164,790.29	311,793.53	677,413.71
Kansas City.....		39,634.27	150,897.61	332,145.49	309,106.79	831,784.16
Dallas.....	1,353.62	35,888.58	80,191.52	268,329.88	132,651.09	518,414.69
San Francisco.....	2,726.51	137,996.92	208,486.34	377,421.12	590,811.02	1,317,441.91
New Orleans branch.....		28,332.71	60,320.38	79,005.33	88,140.55	253,798.97
Total.....	358,221.43	4,142,794.84	6,423,863.19	12,644,323.82	8,351,878.54	31,921,081.82

The necessity for depositing income and profits taxes in special depository banks during the fiscal year 1919 was obviated by two factors:

(1) Such taxes were permitted by law to be paid in four quarterly installments instead of having to be made in one payment as heretofore.

(2) Treasury certificates of indebtedness receivable in payment of income and profits taxes were sold in advance to taxpayers. By this method the financial problem had adjusted itself before the taxes were due and no shifting of large sums of money resulted.

By Department Circular No. 144 collectors of internal revenue are required to deposit their entire receipts in Federal reserve banks or branch banks where such banks are located in the headquarters city of the collector. Where the collector is not located in a Federal reserve or branch Federal reserve city, he deposits cash and checks drawn on local banks (other than checks received exclusively in payment of income and profits taxes in the months of March, June, September, and December) with local national bank depositories. All out-of-town checks (and checks in payment of income and profits taxes in the months of March, June, September, and December) are forwarded to the Federal reserve bank or a branch of the Federal reserve bank in the district in which the collector's office is located. This use of the collection system of the Federal reserve banks permits the Treasury to obtain earlier credit for checks received in payment of internal-revenue taxes and obviates the necessity of maintaining larger public balances in depository banks to enable them to carry the float resulting from the immediate credit to the Government's account of the amount of the great number of checks received on account of taxes.

UNITED STATES DEPOSITARIES IN FOREIGN COUNTRIES.

Depositaries of public moneys of the United States were appointed in Belgium during the fiscal year 1919, and in addition the Treasury continued such depositaries in France, Great Britain, Italy, Spain, Switzerland, Argentina, and Canada. These depositaries were designated under the authority vested in the Secretary of the Treasury by section 8 of the act of September 24, 1917, as amended. They were of great service to disbursing officers of the Government, particularly those of the Army and Navy, in making prompt payments and transacting public business in foreign countries.

PAYMENT OF SPANISH-AMERICAN WAR BONDS.

Additional bonds of the 3 per cent loan of 1908-1918, popularly known as the Spanish-American war loan, which matured and ceased to bear interest on August 1, 1918, were presented to the Treasury for payment during the fiscal year 1919. On the date of maturity there were \$63,945,460 of these bonds outstanding. During the first month after maturity \$55,414,960, of the securities were presented for payment. Other amounts have been presented from time to time until on June 30, 1919, \$936,000 were outstanding, and on October 1, 1919, \$858,600 were outstanding. Thus during the period of the creation of a new war debt—the greatest in the history of America—the debt remaining from the last previous war in which the United States was engaged has been virtually extinguished. While the amount is relatively small when measured by the standards of these record-breaking days, its payment, particularly in the circumstances, reflects the policy of the United States in promptly discharging its obligations.

BOND-SECURED CIRCULATION OF THE NATIONAL BANKS.

The situation with respect to operations under section 18 of the Federal reserve act in connection with the retirement of bond-secured circulation of the national banks and the refunding of 2 per cent bonds bearing the circulation privilege into one-year 3 per cent Treasury notes and 30-year 3 per cent bonds remained unchanged throughout the fiscal year 1919. Owing to the demands for currency, applications from member banks for the sale of bonds securing circulation were negligible and no 2 per cent bonds bearing the circulation privilege were retired during the year. It should be pointed out, however, that the amount of bonds available for securing circulation was reduced during the year by \$63,945,460 by reason of the maturity of the Spanish-American war 3 per cent bonds which became due and payable on August 1, 1918.

On January 1, 1919, the balance of \$9,301,000 one-year 3 per cent Treasury notes then outstanding matured, were paid, and the option held for their renewal was not exercised by the Secretary. With this payment the total amount of one-year 3 per cent Treasury notes, aggregating \$27,362,000, issued under section 18 of the Federal reserve act in lieu of retired 2 per cent bonds having the circulation privilege has been retired and no longer appears as an item of the public debt.

United States bonds bearing the circulation privilege were outstanding on October 31, 1919, as follows:

4 per cent loan of 1925.....	\$118, 489, 900
2 per cent consols of 1930.....	599, 724, 050
2 per cent Panamas of 1916-1936.....	48, 954, 180
2 per cent Panamas of 1918-1938.....	25, 947, 400
	793, 115, 530

The amount of national bank circulation secured by United States bonds on October 31, 1919, was \$722,394,325, as compared with \$721,471,138 on October 31, 1918.

FUNDS FOR ARMY PAYMENTS IN EUROPE.

The method of providing Army payments in Europe, which was outlined in the report for the fiscal year 1918, has been continued up to the present time. This plan has greatly facilitated payments to United States troops in Europe and the settlement of other Government obligations incurred in foreign countries.

Minor modifications of the original scheme have been made to meet changing conditions abroad, such, for instance, as the transfer from Paris to Washington, toward the end of the fiscal year, of the auditing of the accounts of disbursing officers in the military establishment. Under the provisions of the Army payment plan, the cash balance maintained in France has been available to pay the checks of any disbursing officer of the Army located in that country; likewise, the cash balance maintained in England has been available to pay checks of any Army disbursing officer located in that country. It has not been necessary to carry a balance for the credit of each officer and under each appropriation. This method has greatly reduced the amount of cash balances in foreign countries required to finance the Army. It has been of great assistance to the Treasury in reducing the constant drain on the general fund. Since the Government has had to borrow money to meet its current expenditures, the reduction of transfers from the general fund results in the saving of interest charges. Much has been saved in that direction and experience has fully justified the value of the Army payment plan.

AUDIT OF ACCOUNTS ABROAD.

The general purposes of section 12 of the act of September 24, 1917, providing for the audit of the accounts of the military establishment abroad, were fulfilled during the fiscal year. The audit was authorized by law not only to facilitate the operations of disbursing officers of the military forces but also to avoid the necessity of shipping each month from Europe the originals of vouchers and pay rolls, thus subjecting them to the danger of loss by submarines and other war perils. Because of the progress made in the demobilization of the Army the Assistant Auditor for the War Department abroad was recalled just prior to June 30, 1919, and the work carried on at Paris by that office is now being performed by a division, established for the purpose, in the office of Auditor for the War Department at Washington.

It was thought advisable to continue the office of the assistant comptroller in Paris after the recall of the auditor's force until such time as disbursements by the military establishment abroad should be reduced materially. It was believed that Army disbursing officers would be assisted and many erroneous payments prevented by continuing the facilities accorded them of obtaining advance decisions on proposed payments and such similar assistance as could be rendered by the office. This view has been justified by subsequent events and in addition the services of the assistant comptroller in Paris have been utilized in connection with financial transactions under the direction of the Secretary of the Treasury, such as the daily transmission to the Treasury Department of a statement of receipts, disbursements, and balances reported by the French Treasury, the supervision over indemnity bonds and issuance of duplicate checks where disbursing officers' checks have been lost, and other miscellaneous work of the department. After the close of the fiscal year 1919 the assistant comptroller's office in Paris was directed to close up its work about October 1, and the employees of that office were directed to return to Washington.

The accounts of disbursing officers, with the vouchers and papers connected therewith, filed with the assistant auditor in Paris, were shipped to Washington in June, 1919. These accounts contain the original pay rolls and vouchers covering the disbursements of the Army during the entire period of our participation in the fighting in Europe. Through the cooperation of the War Department in arranging for the transportation, these papers, filling several freight cars, were received in Washington promptly and safely. Their value historically and in adjusting the pay due soldiers, living and dead, as well as in settling claims of all kinds, is apparent. They will be needed as original evidence for many years.

A BUDGET SYSTEM.

For many years the question of a budget system has been discussed by the country in a rather desultory and disinterested manner. Secretaries of the Treasury have earnestly recommended the creation of a budgetary plan under which the Government's outgo would be properly related to its income along the lines of intelligent and scientific control and responsibility. The time when this question might be considered from a purely academic point of view as to what is desirable as an improvement has now passed. The compelling force of necessity has arrived. There has been a wholesome public discussion of the matter in recent months, accompanied by an increasing realization on the part of the public of the imperative need of budgetary reform. The large expense involved in the aftermath of the war, the interest and sinking-fund charges on the public debt, and the growth of the Government leave no room for doubt that we shall never return to the prewar standard of expenditures. The cost of running the Government of this great Nation will mount into huge sums, which will be increased as additional burdens upon the taxpayers of the country by every element of duplicated effort, waste and inefficiency. There can be no question or argument now as to the necessity of a budget system, and the people of the country, aroused to the needs of the situation, will sooner or later insist upon the adoption of an effective plan, for the answer to inaction is increased taxation.

The Treasury is pleased to note that the Congress already is giving careful consideration to this important question and has been glad of the opportunity to present its views. That there should be one single authority responsible for the preparation and execution of the Government's program of finance and that appropriations should be made not independently of each other but with reference to one single comprehensive plan of expenditure properly related to the Government's income there can be no doubt. The burden of preparing the budget must, in the nature of the case, if the work is to be properly done and responsibility centered instead of divided, rest upon the Executive. The supervision of the preparation of the budget should be vested in the Secretary of the Treasury, who is the chief fiscal officer of the Government and, as such, should be the representative of the President in budgetary control. The budget, as thus prepared for the President and on his responsibility, should not, as such, be increased by the Congress, and the department has ventured to express the opinion that appropriations should be considered by a single committee of the House of Representatives and the Senate. As a further step in the plan, unquestionably the audit system should be reformed by the consolidation of the offices of the Comptroller of

the Treasury and the Auditors of the Treasury into one central organization, to which would be transferred the present duties and powers of the comptroller and the auditors, with the added authority to examine into and make report upon the methods employed and the results obtained by the executive departments of the Government. Such reports should be submitted to the Congress and to the Secretary of the Treasury.

Some sincere advocates of a budgetary system, in their enthusiasm to see the movement started and believing that it is not possible to obtain a reasonably complete plan in the beginning, have suggested that the reform be accomplished by gradual stages. With that view the Treasury does not agree, because such a program undoubtedly would retard rather than accelerate true budgetary reform. All movements of change proceed slowly and gradually through a period of discussion, but when the time for action arrives they must take effective form if they are to succeed. Modification of the present system will not be a budget simply because it is called a budget. An effective plan must deal with the three fundamental aspects of the problem, namely, the centering of responsibility in the Executive, the exercise of self control in the Congress and the consolidation and expansion of the audit system. Any other plan would be misleading to the country and only result in the postponement of the desired reform.

REVOLVING FUNDS AND REIMBURSEMENTS OF APPROPRIATIONS.

The necessity during the period of war emergency of providing greater freedom of administrative action involving the use of public moneys has been recognized by the Congress in various ways. The expedient of appropriating for so-called "revolving funds" has come into existence and from time to time there has been repeated the practice which finds ample precedent in the past of authorizing specific appropriations to be reimbursed by moneys received from the sales of Government property and supplies, or otherwise, so as to renew or increase the amounts originally appropriated. The device of appropriating for revolving funds developed during the war, while that of providing for the reimbursement of appropriations is of long standing. They are essentially the same in principle. Such measures doubtless were necessary in the cases in which they were employed during the crisis of war, when it was desirable to grant wide discretion and extensive powers in order to permit the largest effort to be devoted to the supreme task of defeating the enemy.

Now that the war emergency has passed, the Treasury desires to invite the attention of the Congress to the grave menace to the con-

trol of appropriations and to the finances of the Government involved in any extension of appropriations of this character, or even of their continuance, unless in clearly exceptional cases. By such appropriations the revenues of the Government affected never become unconditionally available to meet general expenditures, but are appropriated automatically for special purposes without further control by the Congress and without any new consideration of the merits of the additional expenditure. These appropriations by their very nature tend to produce expenditures which, if considered anew, might not be authorized by the Congress, and I believe that their discontinuance, to the utmost limit possible, is an essential condition of any program for rigid economy in Government expenditure. To appropriate receipts accruing to the Government in this manner for special purposes takes the money just as truly out of the Treasury as if directly appropriated in specific sums, but at the same time conceals the real extent of the appropriation involved. I feel very strongly that, in general, the receipts of the Government should be covered into the Treasury unconditionally without being affected by any special trust or purpose, and that, so far as may be, expenditures of the Government should be made pursuant to direct appropriation of the Congress.

While revolving funds and the like may be regarded as emergency measures growing out of war needs and not likely of repetition under ordinary conditions, it is thought advisable to bring the subject to the attention of the Congress at this time because of the tendency to seek administrative liberty of action with relation to public moneys, without the usual Treasury supervision. The disposition of administrative officers is to acquire as wide discretionary control over appropriations for their departments or establishments as the Congress will permit, and every recognition by the Congress of the need of such administrative control in specific cases is accepted as an argument for further and similar grants of authority. The discretionary power allowed over expenditures from specific or annual appropriations, in ordinary circumstances, is not a matter which concerns the Treasury except in the routine discharge of the statutory duties of its officers. But the grant from the Treasury of a revolving fund with or without qualifications or limitations as to its use, or the increase of appropriations by so-called reimbursements, creates a situation that is indefinite and uncertain both from the viewpoint of the Congress and of the Treasury.

In addition, it is pertinent to point out that appropriations of this character present large and important accounting difficulties in that they bring into Government affairs features somewhat unfamiliar in the accepted scheme of accountability to the Treasury, and which,

furthermore, are not wholly in keeping with the permanent statutory requirements from which the intent of the Congress with reference to appropriations and accounting for public moneys has hitherto been drawn. The general intent of the Congress with reference to the use of appropriations and the accountability of responsible officers to the Treasury for all moneys received by them for the use of the United States from any sources whatever are well settled. Moreover, the appropriation acts themselves usually contain a statement of intent by means of limiting clauses or provisos which serve as guides to Treasury administration. The intent of the words "revolving fund" in appropriation acts, however, is not always apparent, and resort is necessarily had to construction in the light of acknowledged principles as applied to the objects to be accomplished. The difficulties are not all of interpretation from an accounting viewpoint. There remains a large field of transactions based upon the revolving-fund principle over which the Treasury has no opportunity of exercising supervision. This loophole in fiscal control permits large expenditures without adequate accountability and makes difficult the application of proper administrative measures in relation to the basic specific appropriation itself. The provisions for an accounting and the disposition of revenues, for example, appear to relate solely to final balances and not to the transactions leading up to them. The whole revolving-fund principle is out of harmony with the permanent legislation that has heretofore safeguarded the use of public moneys, and makes difficult the fulfillment of the statutory duties imposed upon the Treasury. It was justifiable only in the emergency of war.

Mention also should be made of the statistical difficulties encountered in connection with such appropriations. Under the law and in accordance with long-established custom, receipts which are covered into the Treasury as reimbursements of appropriations, and likewise receipts that are credited to revolving funds, do not appear as receipts on the daily and other financial statements of the Government, but they are deducted from the expenditures. This is an undesirable procedure. The law should require that such moneys be deposited in the Treasury as receipts of the Government.

These manifestations of present-day tendencies show a serious departure from the orderly procedure with respect to appropriations, and the subject is commended in its relation to the Treasury as one worthy of careful consideration with the hope that, with the passing of the war emergency, the Congress will not permit the extension of these principles but will meet the needs of all Government agencies, as far as possible, by definite appropriations with the requirement that all receipts accruing to the United States from whatever source shall

be covered into the Treasury for the general purposes of the Government.

INCORPORATED GOVERNMENT AGENCIES.

The subject of incorporated Government agencies is closely related in its importance to the Treasury to that of appropriation for revolving funds and reimbursable appropriations. This means of handling some large and unusual activities of the Government was necessary during the war, but, now that the emergency has passed, there can be no justification, generally speaking, for the creation of new Government-owned corporations or the continuation of those in existence except in unusual cases or for the purpose of winding up their affairs. At the least, such agencies should not be exempted from amenability in future to the accounting laws of the United States and the regulations of the Treasury made in pursuance to the statutes unless good and controlling reasons are given therefor. The particular advantage (which I should rather call menace in time of peace) accruing to Government functions so organized, is the freedom which they enjoy in the expenditure of public money without the legal restrictions that the Congress has imposed with respect to the usual transactions of the Government. If these activities were sustained by specific appropriations and were required to withdraw their funds from the Treasury in the manner prescribed for other Government establishments with the same accountability both as to disbursements and receipts, there would be little or no ground for the corporate form of organization.

Attention has been called particularly to this recent innovation among the instrumentalities of Government by reason of the requirement of the Congress by act of July 1, 1918, long after operations had been undertaken along commercial lines without regard to Treasury accountability, that the Secretary of the Treasury should assume the responsibility of an audit of the financial transactions of the United States Shipping Board Emergency Fleet Corporation, under such rules and regulations as he should prescribe. It is almost needless to say that a task of that nature imposed at so late a day is well-nigh impossible of fulfillment with any marked degree of satisfaction.

Authorization given by the Congress empowered the corporation to control certain specific appropriations and account for them to its own board of management and in such reports as are required to be made to the Congress. The congressional appropriations were not disbursed, therefore, through a disbursing officer and charged to him on the books of the Treasury as in ordinary circumstances, but were given to the corporation on settlements made by a Treasury

auditor as moneys due and paid on settlement warrants, for which there is no accounting to the Treasury. The action of the Treasury in this respect was in accord with law and with the evident purpose of the Congress in having the specific appropriations made from public funds spent as the money of any corporation would be spent, without reference to the laws limiting and restricting the use of moneys by the regular departments and establishments of the Government. Under such conditions vast sums have been handled as earnings and as expenditures without regard to their character as public moneys and without the restraining application of the Treasury regulations which have been brought into being by reason of the legal requirements and restrictions surrounding the Government's financial transactions in ordinary circumstances.

A mere glance at the situation occupied by these incorporated agencies under private control and at their manifest weaknesses when compared with government-controlled agencies or with business corporations not connected with the Government will bring conviction that the device is not a happy one for the Government's finances or a satisfactory one to the managers charged with responsibility for their economical administration. This is due not alone to the inherent difference of men and methods, trained under different systems and evolved from different schools of efficiency, but also to a difference in the view taken of the objects to be accomplished. Government officers charged with administrative achievement are charged at the same time with obedience to restrictions placed upon the use of appropriated funds, and the object of their endeavors is thus made twofold. A proper regard for the interests of the public treasury is not the least of their duties. The officers of a private corporation seeking its own ends find the object of their efforts in the accumulation of business profits, unrestrained by any other law, as a rule, than is to be found in penal legislation. But the objective of business profits is in itself a restraint and a guide to their actions and, above all, a check on extravagant expenditures and on inefficiency. The corporation created and utilized as a Government agency, however, operating on a capital for which it has no accountability and which has been drawn from the public treasury with a prospect of further access to public funds in time of need, whether the need shall arise from successful expansion or wasteful expenditure, has none of these restraints; and its objective may depart ever so far from congressional intent without a test or any standard by which its full accomplishment or failure may be measured. These concerns become, primarily, spending agencies without the restrictions and obligations imposed by law upon Government establishments or those imposed by invested capital upon private corporations which are to be tested

by profits earned. They stand alone, therefore, without tests or standards; without regulations or responsibility imposed by Government authority or by individual holders of their securities; and without other guaranty of integrity and efficiency than may be derived from the selection of their officers, who may be given an arbitrary power over their affairs.

Other cases than the Emergency Fleet Corporation could be cited as typical of the anomalous position of such incorporated agencies with respect to the Treasury; but it is thought that the difficulties of safeguarding the public interests and carrying out the statutory intent with respect to the public funds must be obvious from a mere statement of their character. But for the somewhat prevailing tendency to make commercial methods applicable to Government transactions there is little or no excuse for excepting such agencies, now that the war emergency has passed, from the usual requirements and restrictions built up on the experience of many years and preserved by legislative enactment for general application to the financial transactions of the Government.

It is undeniable that government has come to mean very largely a scientific business organization operating for the benefit of the public. Its operations must be based on efficient handling of public finances for the benefit of those in whose interest the machine is run or else it is a failure with respect to those interests. In this sense its operations have a direct bearing on the living cost and the material welfare of the individual. In no respect is this direct connection between the public treasury and the welfare of the individual more advantageously manifested than in the economies and safeguards and efficiencies which should surround the business activities of the Government.

There are very substantial grounds to be found in experience for the view that strictly governmental establishments are oftener than not administered more efficiently than many business concerns that are frequently pointed out as models for the business of government, and that government methods are more effective for the purposes of government than are the methods employed by private corporations. Certainly it would seem that the time has come when the use of revolving funds and the employment as governmental agencies of chartered corporations operating under individual personal control, and all similar devices, are no longer justified by emergency needs. They inherently contain possibilities of extravagant methods of accomplishing results which might be accomplished better and more economically by means of the tried and tested machinery distinctively governmental in character and operation.

The experience of the Treasury confirms the view that the so-called red tape of government in accounting can be shown upon fair analysis to be but an orderly procedure of safeguards and checks, easily followed by one who has a proper regard for the interests of the public, and presenting no obstacles to business efficiency except to those who have an interest to serve by promoting a certain laxity of administration. And nothing promotes so rapidly an atmosphere of laxity as a removal of the legislative restraints long and zealously imposed by the Congress with respect to appropriations from the public funds or a weakening of the established requirement that public moneys shall be deposited in the public treasury and withdrawn only in consequence of legislative authorization.

With reference to the public funds, the consideration by the Congress of the use of incorporated agencies as instrumentalities of government is urged.

CHECKING ACCOUNTS OF GOVERNMENT CORPORATIONS AND THE RAILROAD ADMINISTRATION CARRIED BY THE TREASURER.

The United States Shipping Board Emergency Fleet Corporation, the United States Housing Corporation, the War Finance Corporation, and the United States Food Administration Grain Corporation have continued to maintain checking balances with the Treasurer of the United States, as outlined in the previous annual report of the Secretary of the Treasury.

The total amount of the checks drawn on the Treasurer by the United States Shipping Board Emergency Fleet Corporation which have been paid from February 28, 1918, when the balances of that corporation were transferred to the Treasurer, to October 31, 1919, was \$4,331,872,379.71. The total balances on deposit with the Treasurer on October 31, held for credit of the disbursing agents of the corporation, amounted to \$208,332,821.86.

The total amount of the checks drawn on the Treasurer by the United States Housing Corporation which have been paid from July 27, 1918, when the checking credit was established on the books of the Treasurer for the corporation, to October 31, 1919, was \$123,696,668.98. The total balances on deposit with the Treasurer on October 31, held for credit of disbursing agents of the corporation, amounted to \$4,557,892.25.

The total amount of checks drawn on the Treasurer by the War Finance Corporation which have been paid from June 2, 1918, when the checking credit was established on the books of the Treasurer for the corporation, to October 31, 1919, was \$1,454,988,813.34. The total amount of balances on deposit with the Treasurer on October 31, held for credit of the War Finance Corporation, was \$28,165,824.59.

The United States Food Administration Grain Corporation has not used the Treasurer's office to the same extent as the other Government-owned corporations enumerated above. The total checks paid by the Treasurer from October 31, 1918, when the first credit was established for the Grain Corporation, to October 31, 1919, was \$436,200,000. The total amount of balances on deposit with the Treasurer on October 31, held for credit of the corporation, was \$177,290,209.70.

In addition to the above, the Russian bureau of the War Trade Board and the Railroad Administration maintained checking accounts with the Treasurer of the United States. The total amount of checks drawn on the Treasurer by the Russian bureau of the War Trade Board which have been paid from November 30, 1918, when the checking account was established on the books of the Treasurer for the corporation, to October 31, 1919, was \$11,639,-807.69. The total amount of balances on deposit with the Treasurer on October 31, held for the credit of the Russian Bureau of the War Trade Board, was \$1,048,987.03.

The total amount of checks drawn on the Treasurer by the Railroad Administration, which have been paid from April 13, 1918, when the first checking account was established on the books of the Treasurer for the Railroad Administration, to October 31, 1919, was \$1,313,977,605.60. The total amount of balances on deposit with the Treasurer on October 31, held for the credit of disbursing agents of the Railroad Administration, was \$17,373,159.60.

Pursuant to the request of the Director General of Railroads, the Treasurer of the United States was designated as his agency for the payment of the principal and interest of the certificates of indebtedness issued by the Director General of Railroads on account of compensation for the possession, use, control, and operation of railroads and systems of transportation under Federal control; for motive power, cars, or other necessary equipment, or parts thereof, or material or supplies therefor, furnished to the director general for use on or in connection with the operation or utilization of the property of railroads and systems of transportation under Federal control; and for the purchase or construction of boats, barges, tugs, and other transportation facilities furnished to the director general for use on or in connection with the operation or utilization of the property of railroads and systems of transportation and of inland, canal, and coastwise waterways under Federal control.

The Treasurer has paid these certificates of indebtedness directly and through the Federal reserve banks. The holders of the certificates were notified that payment of principal and interest, to July 15, 1919, inclusive, would be made at the Treasury in Washing-

ton, or, at the option of the holders of the certificates, at the Federal reserve banks.

To make payment of these certificates the treasurer of the Railroad Administration established a credit of \$288,526,150.13 with the Treasurer of the United States. The payments made by the Treasurer of the United States from July 15, 1919, to September 30, 1919, amounted to \$288,399,222.46.

The total amount of payments which have been made by the Treasurer for the above-named Government-owned corporations and the Railroad Administration up to and including October 31, 1919, were \$7,960,774,497.78.

The plans evolved by the Treasury for handling the accounts and disbursements of these agencies of the Government have been operated to the entire satisfaction of all concerned. The funds have been assured absolute security and appropriated moneys running into large amounts have not been withdrawn from the Treasury until needed to pay obligations of the Government, thus reducing the amount of Government borrowings with the consequent saving in interest charges.

SALARIES OF GOVERNMENT OFFICERS AND EMPLOYEES.

It is earnestly to be hoped that the Congress will give careful consideration to the question of salaries in the public service. While in the light of experience I can speak only for the Treasury, undoubtedly the same problem respecting personnel that confronts this department obtains in the other great Government establishments in Washington. The largely multiplied business of the Government can not be conducted with efficiency and economy unless there be attracted to and retained in the public service a group of highly trained, well paid, and permanent officials of supervisory grades. Uncertainty of tenure in some instances and inadequacy of compensation have closed the public service to many men of the best type or forced them out of Government employ at the moment of their greatest usefulness. The war has increased the public debt more than twenty-five fold and has augmented the functions and activities of the Government in many ways. The duties are greater and the responsibilities are larger than those of other days, to the standards of which it is not to be expected that the Government will ever return. The conditions are such that failure to take the necessary action to invite and hold in the public service men of exceptional ability and of real distinction in their fields can result only in grave burdens to the taxpayers of the country and in possible disaster.

Already the transaction of the business of the Government is hampered by deficiencies of personnel due to the return to private life of many men of large capacity who, during the period of active warfare, were willing and glad to serve their country at great personal sacrifice. I have come to learn that there are heroes in the civil establishments as well as in the military services, self-sacrificing patriots who toil year in and year out for a bare pittance when they could command salaries double or treble the amounts they receive from the Government, but who for the love of their country and for the love of their work have rejected alluring offers in the field of private enterprise. They were too fine and too patriotic to leave their posts at a time when their services were indispensable. Under the compelling force of patriotism they made willing sacrifices during the war, but with the return of peace, the Government can not expect to retain these employees indefinitely, because in justice to themselves and their families they will sooner or later accept the larger opportunities that are open to them in the world of business and industry unless the Government proposes to pay them salaries that at least reasonably approach the value of their services.

Only prompt action by the Congress to build up a permanent and dignified civil service which will include men of great ability and high attainments can prevent mistakes and failures in the transaction of the public business, the consequences of which may be calamitous. This does not mean a wholesale increase in the Government pay roll but such reclassification, new positions and increased salaries as may be necessary to obtain and hold employees of the character so imperatively needed in the interest of economy, efficiency and safety. The Congress has already taken a step in this direction by the creation of the Joint Commission on the Reclassification of Salaries, and it is to be hoped that that body will find the solution of the pressing problem of compensation in a plan that will grant a living wage to all employees commensurate with their relative value to the Government and afford salaries that are comparable with those paid to men and women in private enterprise.

RETIREMENT OF CIVIL-SERVICE EMPLOYEES.

The logical corollary of the necessity for adequate salaries for the personnel of the Government is the imperative need of an equitable retirement law for civil-service employees. Economy and efficiency in the public service and justice to faithful employees who have toiled through the best years of their lives in the interest of the Government require that provision be made for the retirement of those who are superannuated or disabled. Previous Secretaries of

the Treasury have urged the passage of such an effective retirement law, and to their recommendations I give my hearty indorsement.

In this connection attention is invited to the proposal of Secretary McAdoo that the Congress, in framing a retirement measure, consider the possibilities of an expansion of the principles underlying war-risk insurance. I agree with my predecessor that the solution of the problem lies along the lines of insurance with both the Government and the civil employees contributing to a scientific plan that will provide for retirement as well as insurance against death.

FEDERAL FARM-LOAN SYSTEM.

The Federal farm-loan system has operated effectively and successfully during the past year, amply justifying the great purpose for which it was created and meeting the expectations of its advocates. The Federal land banks have continued to make loans to farmers at $5\frac{1}{2}$ per cent per annum, and the joint stock land banks at 6 per cent. All loans, as provided by the act, have been made on the amortization plan, the borrower making a fixed payment, annually or semiannually, which is at least 1 per cent in excess of the interest charge, such excess being applied on the principal. As the balance of the principal due decreases the proportion of this level payment absorbed by the interest charge correspondingly decreases and a constantly increasing balance is applicable to the extinguishment of the debt. This principle, while familiar to actuaries and statisticians, had not been applied in this country to individual mortgages to any appreciable extent prior to the enactment of the Federal farm-loan act in July, 1916. The great success of the farm-loan system has called attention to the advantages of this method of paying debts, and the application of the amortization plan to all mortgages, urban and rural, is now being actively urged by influential private organizations.

During the 12 months ended September 30, 1919, loans were made by the Federal land banks to the farmers of the United States to the aggregate amount of \$129,271,662, an increase of \$10,742,839 over the corresponding period a year ago, and making a total of loans by the Federal land banks from the inception of the system in March, 1917, of \$261,175,346. The subjoined table indicates the amount of the loans made by each of the banks in the years referred to and in the aggregate:

District.	Federal land bank.	Loans made Oct. 1, 1917, to Sept. 30, 1918.	Loans made Oct. 1, 1918, to Sept. 30, 1919.	Aggregate of loans made from date of or- ganization in March, 1917, to Sept. 30, 1919.
1	Springfield, Mass.....	\$4,999,630	\$4,738,200	\$9,913,545
2	Baltimore, Md.....	4,323,150	5,277,550	10,401,000
3	Columbia, S. C.....	6,198,905	7,361,150	13,891,045
4	Louisville, Ky.....	7,490,700	9,460,700	17,959,900
5	New Orleans, La.....	8,800,135	8,722,715	18,192,505
6	St. Louis, Mo.....	8,166,065	12,149,270	20,895,940
7	St. Paul, Minn.....	17,380,500	14,886,100	33,605,900
8	Omaha, Nebr.....	14,418,050	20,267,450	35,390,290
9	Wichita, Kans.....	10,292,922	9,045,000	23,311,800
10	Houston, Tex.....	11,264,287	16,885,787	28,666,561
11	Berkeley, Calif.....	7,315,800	6,019,400	14,065,400
12	Spokane, Wash.....	17,878,679	14,458,340	34,880,860
	Total.....	118,528,823	129,271,662	261,175,346

There have been 27 joint stock land banks incorporated by private capital under the terms of the act, with aggregate capital of \$8,500,000. Nineteen of these banks were incorporated during the past year, and therefore can not be said to be, as yet, in full and active operation. The loans made by the joint stock land banks aggregate \$41,787,359, which added to the loans of the Federal land banks makes a total of \$302,962,705 lent to farmers by all of the banks composing the system. The banks of this character have grown very strikingly in number and in volume of business during the past year. Owing to the fact that they were not established until after the Federal land banks, and that for some time there were only a few in operation, their loans represent only 14 per cent of the total, but during one or more recent months they have transacted as high as 30 per cent of the whole volume of business of the system. Notwithstanding this division of the field, the Federal land banks have done a larger volume of more desirable business than in the previous year, the membership of existing farm-loan associations has grown, and over 600 new associations have been organized.

A very gratifying feature of the year is the remarkable improvement in the financial position of the Federal land banks. During the first year of their existence, and part of the second year, they necessarily operated at a loss. This was inevitable, and was anticipated by the proponents of the system and those who were familiar with the business. The 12 banks opened in the spring of 1917 with an aggregate capital of \$9,000,000, of which \$8,892,130 was subscribed by the Government and \$107,870 by individuals. Before the close of the first year over \$600,000 of this original capital had been absorbed by the excess of organization and current expenses over the scanty receipts of that period. By January 31, 1919, this amount had been

made good out of earnings. Under the provision of the Federal farm-loan act that after subscriptions to capital stock by farm-loan associations shall amount to \$750,000 in any Federal land bank, one-fourth of all sums thereafter subscribed shall be applied to the payment and retirement of the stock originally subscribed, eight of the banks had, up to November 15, 1919, paid and retired \$1,198,890 of the stock originally subscribed by the Government, thereby reducing the amount of stock held by the Government on that date to \$7,693,240. Notwithstanding such retirement of stock originally subscribed, the aggregate capital stock of the 12 banks increased from \$9,000,000 at the start to \$21,321,687 on November 15, 1919.

Up to October 31, 1919, the net earnings of the 12 banks amounted to \$1,278,394.41, of which \$202,175 had been carried to reserve account, \$332,923.98 distributed in dividends paid by five banks upon stock owned by farm-loan associations and individuals, and \$743,295.43 is still carried as undivided profits.

Another gratifying feature, testifying alike to the security of the loans made, the ability and willingness of borrowers to make payment, and the efficiency of the collection machinery of the banks, is the unusually small total of delinquencies. To September 30, 1919, payments due by borrowers to the banks had accrued to the amount of \$12,666,313.61. Of this sum the amount remaining unpaid on that date was only \$172,456.72, or 1.4 per cent of the total. Of that amount \$86,816.60 was 30 days or less overdue, \$25,182.05 from 30 to 60 days, \$14,872.85 from 60 to 90 days, and only \$45,585.22 over 90 days overdue. This record has been made notwithstanding widespread disaster to crops in several sections of the country.

The Federal farm-loan act provides that "the salaries and expenses of the Federal farm loan board and the farm loan registrars and examiners * * * shall be paid by the United States." The system is now so well established and is in such financial condition that this assistance from the Government, in the judgment of the Federal farm loan board, concurred in by officers of the banks, is no longer necessary or desirable. The board accordingly has recommended that beginning with the fiscal year 1921 its expenses be provided for by assessments against the Federal land banks and the joint stock land banks in proportion to their gross assets. Measures for this purpose have been introduced in both houses of the Congress and, should the plan be adopted, the Government will be relieved entirely from the payment of the expenses involved. To have put the system on such a basis in three years is a very gratifying and satisfactory result.

The primary purpose of the Federal farm-loan system, as expressed in the title of the act creating it, was "to provide capital for agricul-

tural development." The accomplishment of that purpose necessarily involved the possibility of an enhancement of farm-land values. In so far as such enhancement was based upon increased production or added attraction to farm life, it was legitimate and desirable. Indeed, there were many sections of the country where, owing either to the exodus of young men from the farms to industrial pursuits in the towns, or to local and peculiar conditions, farm lands were selling at prices much below their intrinsic value as measured by productive capacity. Any enhancement in land values in these sections which might incidentally result from the operation of the Federal farm-loan system was a general public benefit, as tending to check the urban drift of population and stimulate the local production of foodstuffs. The Federal Farm Loan Board has had in view from the start, however, the importance of guarding the system from complicity in anything approaching speculation in farm lands or such enhancement in their value as would either make them more difficult for men of small means to acquire or add to the overhead cost of producing foodstuffs. The high prices realized by growers for their crops during the war period were naturally reflected in a general increase in land values, but the first indication of any rapid or speculative rise did not manifest itself until a few months ago, when it appeared in some sections of the Middle West. It was claimed, perhaps correctly, in a recent convention of private loaning agencies, that the advances in this section were justified and will be permanent. The Federal Farm Loan Board, however, has thought that in the public interest, and in pursuance of the policy of conservatism which they have always followed, it would be better to follow this movement at a safe distance than to be part of it. They, therefore, issued instructions under date of May 3, 1919, to the banks under their supervision that where sales had taken place within a year at prices materially in excess of previous values such sales were not to be taken into account in the appraisement of the land, and under date of July 7, 1919, that no loans in excess of \$100 an acre were to be made on land used for general agricultural purposes, even where the appraisement was \$300 or \$400 an acre.

SEED-GRAIN LOANS TO FARMERS.

The administration of the seed-grain loans made to farmers in drouth-stricken areas from the sum of \$5,000,000 placed at the joint disposal of the Treasury Department and the Department of Agriculture by the President from the fund appropriated for the national security and defense has progressed steadily during the past year. The nature and scope of this plan as announced in Joint Circular No. 1, dated August 2, 1918, of the Treasury Department and the

Department of Agriculture is outlined in the Annual Report of the Secretary of the Treasury for 1918, pages 107-109. Joint Circular No. 1 made provision for loans to farmers for the fall planting in 1918 only, but subsequently further advances were authorized, while several modifications in the administration of the loans became necessary to meet new and changed conditions.

In the autumn of 1918 a scourge of grasshoppers occurred in certain sections of Kansas shortly after the fall planting in those sections had been completed. The crops of many of the farmers who had received advances from the Government were entirely destroyed by this scourge, and these farmers would have been unable to replant their land that fall had not the Government again extended relief to them. In department telegram dated November 20, 1918, to the president of the Federal land bank of Wichita, the Treasury Department, with the concurrence of the Department of Agriculture, authorized the Federal land bank of Wichita to make additional seed-grain loans for fall planting. These second fall planting loans were made upon substantially similar terms as the first fall planting loans. They were limited, however, to those farmers whose acreage had been planted by means of the first loans and whose crops had been completely destroyed by grasshoppers, a fact to be evidenced by a certificate of an agent of the Department of Agriculture. The maximum loan to any farmer was limited to an amount not to exceed \$150, nor greater than \$1.50 per acre, and a separate guaranty fund was created distinct from the first fall planting guaranty fund. It was provided, however, that any surplus in the second fall planting guaranty fund after the payment of losses should be paid into the first fall planting guaranty fund. These second fall planting loans were not made to farmers in the St. Paul and Spokane districts, as the grasshopper scourge appeared only in certain sections of Kansas.

At about the same time that these second fall planting loans were authorized, a circular entitled "Joint Circular No. 2," dated November 1, 1918, prescribing "Regulations relative to farmers' seed-grain loans for spring wheat planting in 1919 in drouth-stricken areas" was issued by the Treasury Department and the Department of Agriculture. This circular authorized loans for spring wheat planting to farmers who had suffered two successive crop failures through drouth or winter-killing, and in other respects created a plan substantially similar to the plan under which the fall planting loans were made. No farmer who had received loans for the purpose of fall planting could take advantage of these spring planting loans unless the acreage sown by means of the fall planting advances was less than 100 acres, and then only upon an acreage not to

exceed the difference between the acreage which the farmer had planted by means of a former loan and 100 acres. The maximum loan to any farmer was limited to an amount not to exceed \$500 nor greater than \$5 per acre. A guaranty fund was created distinct from the first and second fall planting guaranty funds and it was provided that any balance in such fund remaining after payments had been made on the notes of the farmers whose crops had proved a failure should be applied to reimburse any deficiency existing in the first and second fall planting guaranty funds. Loans for spring wheat planting were made only in the Spokane and St. Paul districts.

In the spring of 1919 representations were made to the Treasury Department and to the Department of Agriculture that in some instances the crops planted in the fall of 1918 by means of Government advances had been totally destroyed by winter-killing or other causes, or so nearly so as to render the crops failures under the provisions of Joint Circular No. 1. In order that such land might not lie idle, and to assist the farmers concerned in obtaining funds for their support, as well as for the liquidation of their indebtedness to the Government, a circular entitled "Joint Circular No. 3," dated March 20, 1919, prescribing "Regulations relative to farmers' seed-grain loans in drouth-stricken areas in the matter of determining crop failure for the purpose of replanting" was issued by the Treasury Department and the Department of Agriculture. Under this circular a farmer whose crop had been destroyed could apply for permission to plow up his land and plant other crops. Before this permission was given, however, and to prevent the destruction of a crop which might justify harvesting, an agent of the Department of Agriculture must make investigation and render to the land bank a certificate of failure. This certificate must show that the stand remaining would not produce 5 bushels or more per acre under good conditions, and that the land would be immediately planted to other crops. Upon receipt and approval by the bank of this certificate of failure the farmer was allowed to plow up his land.

It being customary in certain sections of the Southwest to insure growing crops against hail, the Federal land bank of Wichita in March, 1919, suggested the advisability of insuring the crops of farmers who had received advances from the Government. After a conference of the representatives of the Treasury Department and the Department of Agriculture, the Federal Farm Loan Board was instructed to advise the Federal land bank of Wichita to take the necessary steps to insure the crops in that section, with the understanding, however, that the lien of an insurance company on such a crop would be subject to the lien of the Government. Following this advice, the Federal land bank of Wichita took out a blanket policy of insurance against hail of \$4 per acre on crops planted by means of Government ad-

vances. It was agreed, however, that if a farmer preferred to take out insurance of his own accord, he might do so, provided the policy was made payable to the Federal land bank or was deposited with that institution. Losses by hail having occurred, a circular entitled "Joint Circular No. 4," dated September 2, 1919, prescribed "Supplemental regulations relative to farmers' seed grain loans in drouth-stricken areas covering the matter of insurance of crops" was issued by the Treasury Department and the Department of Agriculture. This circular prescribed the rules and regulations governing the rights and liabilities of farmers whose crops were insured against hail or other casualty, and subsequently destroyed through such causes. It provided that the Federal land bank as financial agent of the United States should apply whatever insurance money it might receive to the payment of the farmer's indebtedness. The balance, if any, must then be returned to the farmer, who would not be required to contribute to the guaranty fund, and who would not be entitled to receive the benefits thereof unless the insurance money was insufficient to cover his indebtedness. It is still too early to determine the exact amount which the Government will realize through these insurance policies, but it is safe to say that by securing this insurance the respective guaranty funds will be relieved to a considerable extent, for the indebtedness of many farmers whose crops were destroyed by hail will be satisfied out of the insurance money instead of by payments from the guaranty funds, thus making the pro rata payments applied on the indebtedness of farmers whose crops have failed through other causes materially greater.

During the summer of 1919 it developed that where a crop would probably not yield more than 4 bushels per acre, an amount which would barely pay the reasonable cost of harvesting, thrashing, and marketing, the farmer would leave his land and go elsewhere to labor for wages unless he were permitted to receive the proceeds of his crop for the immediate sustenance of himself and family. By letters dated August 13, 1919, to the Federal land bank of Spokane, and September 10, 1919, to the Federal land banks of St. Paul and Wichita, signed by the Secretary of the Treasury and the Secretary of Agriculture, the Federal land banks were authorized to release the Government's lien on a crop on the receipt of a certificate from an agent of the Department of Agriculture that the crop had not yielded more than 4 bushels per acre, that the yield was not more than sufficient to pay the reasonable expense of harvesting, thrashing, and marketing, and that the proceeds were necessary to the immediate support of the farmer and his family. The release of this lien, of course, did not cancel the borrower's obligation on his note.

By virtue of loans actually made and completed under the seed-grain plan, a total of 1,137,810 acres were planted according to reports from the Federal land banks. As these loans were made only to farmers who had exhausted their resources and were without commercial basis for credit, this acreage would otherwise have remained uncultivated in large part if not entirely. The total acreage sown as reported by the several Federal land banks is as follows:

State.	Acres.
Kansas.....	312,594
Oklahoma.....	229,589
Texas.....	84,230
New Mexico.....	4,947
North Dakota.....	81,893
Montana.....	421,617
Washington.....	2,940
Total.....	1,137,810

The loans were made to 15,688 farmers, the amount aggregating \$4,200,838. Of this sum the Federal land bank of Wichita made loans for first fall planting to 8,198 farmers, amounting to \$1,873,749; and for second fall planting to 204 farmers, amounting to \$18,596. The Federal land bank of Spokane made loans for fall planting to 1,287 farmers, amounting to \$259,285; and for spring planting to 4,862 farmers, amounting to \$1,690,649. The Federal land bank of St. Paul made loans for fall planting to 271 farmers, amounting to \$51,982; and for spring planting to 866 farmers, amounting to \$306,577.

This general plan enabled more than 15,000 farmers to carry on their farming operations which otherwise would have been abandoned. Without some such agency as the Federal land banks through which these loans were administered as financial agents of the Government, the work could never have been done; and the prompt and satisfactory manner in which this large volume of extraneous business was carried on without disturbing the daily routine of these banks is a substantial testimonial to the efficiency of their organization. The Federal land bank of Spokane was charged with the service in Washington and Montana; that of St. Paul with North Dakota; and that of Wichita with Kansas, New Mexico, Oklahoma, and Texas.

In Oklahoma and Texas and a portion of the Kansas district farmers who have received loans have been favored with abundant harvests and will be able not only to pay their individual indebtedness but also to make substantial contributions to the respective guaranty funds. In portions of Kansas unfavorable weather conditions and the devastation by grasshoppers resulted in a greatly reduced yield—in most cases amounting to a total failure as defined

in the plan; while unprecedented droughts in the plateau region of Montana, and North Dakota resulted in almost complete failure in those sections. Receipts in payment of these seed-grain loans are now coming in, but it is impossible definitely to forecast the result. The success or failure of the plan does not, however, rest upon the financial result, but upon the efficiency of the method employed in extending aid to farmers to tide them over a period of unprecedented agricultural conditions, and with a view to increasing the food supply of the Nation during an emergency and to add to the national security and defense. In view of the acreage sown under this general plan, which otherwise would have been abandoned in large part at least, it may properly be said that the purpose of the seed-grain loans has been well and fully accomplished.

BUREAU OF INTERNAL REVENUE.¹

For nearly eight months of the fiscal year 1919 the Bureau of Internal Revenue was under the necessity of operating in accordance with the provisions of the act of 1917, although during the greater part of that time there was pending in the Congress a bill intended to produce greatly increased revenues and providing for material alterations in the existing system of taxation. While the collection of the various monthly taxes and the work of auditing and adjusting income and other taxes arising under previous legislation was carried forward energetically, the bureau was chiefly occupied during this time with the expansion and improvement of its organization and with other preparations for the administration of the war-revenue act of 1918, which became effective finally on February 24, 1919. Less than three weeks in advance of March 15, the date set for the filing of income and profits tax returns and the payment of the first quarterly installment of these taxes under the new law, the bureau was under the necessity of promulgating regulations and distributing forms for the use of millions of taxpayers throughout the United States. This emergent undertaking was satisfactorily performed through the expedient of issuing and authorizing the use of tentative forms of return on which the liability to tax, if not definitely ascertainable by March 15, might be estimated to the best of the knowledge and belief of the taxpayer. The filing on March 15 of more than 4,000,000 returns and the payment on that date of more than \$1,000,000,000 demonstrated the willingness of virtually all citizens

¹ The figures concerning internal-revenue receipts as given in this chapter differ from such figures carried in other statements showing the financial condition of the Government because the former represent collections by internal-revenue officers throughout the country, whereas the latter represent the deposit of these collections in the Treasury or depositaries during the fiscal year concerned, the differences being due to the fact that some of the collections in the latter part of the fiscal year can not be deposited, or are not reported to the Treasury as deposited, until after June 30, thus carrying them into the following fiscal year as recorded in the statements showing the condition of the Treasury.

to respond promptly, even under the most adverse conditions of administration, to the obligations imposed on them on account of the war-revenue requirements of the Government.

It was estimated that the Revenue Act of 1918 would produce, in the first 12 months, about \$6,000,000,000 of revenue. It appears from the assessments made on the basis of income and profits tax returns filed on March 15, 1919, for the taxable year 1918 that the amount of the estimate will be realized. As a result of the statutory provision authorizing the payment of income and profits taxes in four quarterly installments falling due March 15, June 15, September 15, and December 15, approximately one-half of such taxes assessed in the fiscal year 1919 will be paid in the fiscal year 1920. The actual collections for the fiscal year ended June 30, 1919, including only two of the four installments of income and profits tax payments, amounted to \$3,839,950,612.05, as compared with \$3,694,619,638.72 collected in the fiscal year 1918, including the payment in full of income and profits taxes under the Revenue Act of 1917—an increase of \$145,330,973.33. Reports already received of payments of the third installment of income and profits taxes indicate that with the fourth installment due December 15, receipts from all other sources of revenue provided by the act of 1918, and delinquent and additional income and profits taxes, the aggregate collections during the first 12 months of operation under the new act will closely approach the original estimate of \$6,000,000,000.

Although the delay in the passage of the Revenue Act of 1918 appears not to have resulted in any serious diminution of the revenue, delay in the adjustment of difficult cases of tax liability has been unavoidable, and the audit and verification of taxpayers' returns and claims are not as far advanced at this time as would have been the case had the provisions of the law been available for the information and study of taxpayers and administrative officers at an earlier date. In many thousands of cases it has been necessary, in fairness to taxpayers, to permit extensions of time for the filing of final returns. This in turn has delayed consideration by the Bureau of Internal Revenue of the cases concerned, although the installments due on the estimated amount of tax had in each case been paid.

The benefits accruing to the Government and the taxpayer through the organization of a group of representative business and professional men and a special unit of expert accountants, auditors, etc., for service in the administration of the first war revenue act led to the creation of an Advisory Tax Board by the Revenue Act of 1918. This board was organized March 13, 1919, and was composed of five highly trained and experienced men, including an economist, an accountant, a lawyer, a manufacturer, and a former deputy commissioner of internal revenue. During the first few

months of operation under the new law the board rendered invaluable service in the formulation of regulations and in hearing appeals of taxpayers as well as in advising the income-tax unit of the Bureau of Internal Revenue in the disposition of involved technical cases. By October 1, 1919, fundamental and controlling questions had been determined and regulations and decisions had been constructed to the point of permitting the discontinuance of the board, the duties of which have since been assumed by a special group of tax experts, lawyers, and accountants who have had wide experience and training in the bureau, especially in connection with the operations of the Advisory Tax Board.

Material changes in the statutory bases of internal taxation made it necessary in the administration of the first war-revenue act to effect important changes in the organization of the bureau at Washington. The development of this policy has led to a similar reorganization of the field force. The 64 collection districts have been readjusted so that each State in the Union, with the exception of Nevada, which for the present is embraced in the northern district of California, constitutes at least one collection district, and, with the exception noted, the boundaries of all collection districts now follow State lines. Two or more separate districts have been continued in States where the service seemed to require such arrangement for the time being without necessitating undue duplication of supervisory work, although it is probable that the number of districts eventually will be reduced. In this readjustment 10 new collection districts were established for the States of Maine, Vermont, Rhode Island, Delaware, Mississippi, North Dakota, Wyoming, Idaho, Utah, and Arizona, and the following 10 districts were discontinued: The second, sixth, seventh, and eighth of Kentucky; the seventh of Indiana; the fifth and thirteenth of Illinois; the first of Wisconsin; the ninth of Pennsylvania; and the fifth of North Carolina. The territory formerly embraced within the abolished districts has been added to the jurisdiction of other established districts of the same States. The reorganization of the field service was accomplished through Executive orders signed by the President on June 27, July 19, and July 29, 1919, and the changes became effective August 1, 1919.

As an important part of the reorganization of the field service, branch offices for the transaction of the various forms of internal-revenue business and for furnishing advice and assistance to taxpayers have been established at important points throughout several of the collection districts, and it will be the policy to develop this plan so as to place the tax-service facilities of the Government within convenient reach of every taxpayer. Eventually, it is intended

that every principal city and town will have a branch office operated under the direction of the several collectors of internal revenue.

The special methods of selecting and training employees in the technical work of the Internal Revenue Service which were worked out in considerable detail in the bureau at Washington during the preceding year have been carried into the field. The consequent improvement in the field personnel has permitted the bureau to take an important step toward the decentralization of a large amount of work which in the first year under the new tax laws was handled entirely at Washington. Income-tax returns of less than \$5,000 filed in the fiscal year 1919 were left in the offices of collectors to be audited and adjusted through conferences with taxpayers. As rapidly as is consistent with uniform and accurate disposition of cases, the handling of additional classes of claims and cases will be assigned to the field officers to relieve the congestion of work at Washington and to expedite the collection of additional taxes due, as well as the payment of refunds to taxpayers. A special effort has been made to impress on field officers the importance of uniform courtesy and impartiality in dealing with all taxpayers, so that the transactions of the bureau with the public may be maintained on a businesslike and equitable basis.

The legal and accounting force engaged in the administration of the income and profits tax laws and the audit and verification of nearly 7,000,000 returns received under the acts of 1917 and 1918 has been built up rapidly during the past year. Relatively large additions also have been made to the personnel of those units of the Bureau of Internal Revenue which have immediate supervision of the administration of the laws relating to taxes on estates, commodities, luxuries, and child labor. The force at Washington now numbers 4,088 as compared with 1,367 at the beginning of the year. The income-tax unit, which handles the most important subject matter in the bureau, has been successful in increasing materially the rate of finished cases, both those involving the assessment of additional taxes and those involving the refund of amounts erroneously collected as taxes.

Employers of labor throughout the country have cooperated generally with the Bureau of Internal Revenue in the enforcement of the provisions of the new revenue law imposing a tax of 10 per cent on the net income of certain kinds of business employing child labor. The disposition of employers has been to observe the standard set up in the law by which tax liability may not be incurred and the revenue officers have met with little difficulty in securing the evidences of age which are required by the law to establish exemption from tax. This tax became effective only on April 25, 1919, and no employers have as

yet been found to have subjected themselves to the assessment and collection of the tax provided.

Under the provisions of the Harrison antinarcotic law, providing for the registration and taxability of persons authorized to dispense or sell certain habit-forming narcotic drugs, vigorous efforts have been continued to apprehend and bring to justice persons guilty of engaging in the illicit traffic in these drugs. The number of revenue agents and inspectors specially trained in this line of work has been increased and a considerable number of convictions have been secured. During the year final report was made by the committee appointed to investigate this subject for the department. The wide prevalence of narcotic drug addiction in many parts of the country, as well as the inadequacy of the facilities provided for the rescue and rehabilitation of addicts, is shown by the report. The Revenue Act of 1918 amended the Harrison antinarcotic law in several important respects. Provision was included for the separate classification and registration of persons handling narcotic drugs in the various stages of importation, manufacture, prescription, and distribution, making possible more effective measures for securing information from those persons and enforcing the observance of the law. A tax of 1 cent per ounce is also imposed on the commodity itself, the payment of which is to be evidenced by the affixing of a stamp in such manner as to seal the stopper or covering. The result of this measure is to identify drugs which have passed through the legitimate trade and those which have been procured through the widespread illicit traffic in narcotic drugs. On the authority of Supreme Court decisions rendered during the year, a Treasury decision was issued defining the responsibility of physicians and druggists in dispensing and distributing narcotic drugs. The result of the issuance of this decision, which makes clear the illegality of prescribing or dispensing to habitual users any quantity of narcotic drugs except in the course of legitimate treatment to cure the habit, has been to cut off from thousands of addicts their accustomed sources of supply. Many of these persons are without funds to enter private institutions for the cure of narcotic drug habits and have been reduced to a pitiable condition in which they constitute a serious menace to many communities. Accordingly, to meet this situation the department has recommended to the Congress the enactment of legislation which will put the Public Health Service in a position to undertake the care and treatment of these unfortunates and restore them to a normal condition.

Such a measure is now pending and its early enactment is urgently recommended. The comparative ease with which narcotic drugs may be concealed and smuggled into this country from abroad makes highly desirable some international agreement by which the narcotic

drug trade of the world may be regulated and controlled. Such an agreement is provided in the proposed constitution of the League of Nations, which sets up authority to perfect the ratification of the Hague Opium Convention.

Such police functions as have hitherto been assigned for execution to the Bureau of Internal Revenue have been, in form at least, taxation measures, and it was the judgment of the department that the enforcement of prohibition, which is essentially unrelated both in form and substance to taxation, should not be added to the already onerous responsibilities of this bureau. The Congress, however, having regard to the activities of revenue officers leading to the apprehension and conviction of violators of the laws imposing taxes on the manufacture and sale of alcoholic beverages, has provided by recent enactment for the enforcement of prohibition through the agency of the Bureau of Internal Revenue. To avoid confusion and inefficiency in the administration of the tax laws and of the prohibition measure, it is proposed to organize separately within the bureau a special unit to carry on the prohibition work. Revenue officers of experience in this line of work and no longer needed for the performance of duties in connection with taxes on the prohibited commodities, if qualified for the new work, will be transferred to the supervision of this unit, and sufficient additional force will be provided to carry on a vigorous program in every State. With the expected cooperation of all law-abiding citizens and of State and municipal peace officers, the observance of this law will be energetically sought through both the dissemination of information and prosecution of offenders.

Synthetic glycerin formula.

The termination of military operations in November 1918, made it unnecessary to continue the special project of the chemical laboratory of the Bureau of Internal Revenue for the promotion of the synthetic manufacture of glycerin from the fermentation of molasses according to the formula which had been worked out by the laboratory, as stated in the preceding annual report of the Secretary of the Treasury. This formula, however, which had engaged the attention of a considerable staff of chemists for a period of three months, may have considerable commercial value, as it permits the complete recovery of the raw material in the form of alcohol and potash, as well as glycerin. The formula has therefore been made available to any manufacturers who may be interested.

WAR RISK INSURANCE.

The Bureau of War Risk Insurance, created barely five years ago, has developed from a small beginning into the largest single unit in the Government service, conducting within itself four separate

businesses, each of which is comparable with the greatest of their kind in the field of private enterprise. The records on September 30, 1919, show:

1. A marine and seamen's insurance department—	
Having done a total business of.....	\$2,390,080,236.54
With premiums collected amounting to.....	47,592,510.61
Having issued 33,384 policies and paid claims to the extent of.....	28,737,146.47
With a surplus over expenses and refunds of.....	17,124,903.84
2. A stupendous banking business for the dependents of men in the service making monthly payments of allotments and family allowances by the Government on 2,057,842 awards during the period of a year and a half exceeding.....	
	531,000,000.00
3. An employers' liability department—	
Now making payments each month on claims for military and naval compensation to the extent of.....	2,754,836.13
Having paid burial expenses amounting to.....	1,834,763.33
4. A life insurance department—	
Having written during the period of one year and a half 4,561,974 individual policies representing a total amount of insurance of.....	39,817,391,500.00
With premiums between Oct. 6, 1917, and Sept. 30, 1919, of approximately.....	315,000,000.00
With claims payable to the extent of.....	1,042,457,673.48

During the fiscal year 1919 the character of the bureau's functions was vastly changed from that of the previous year. On June 30, 1918, the United States was engaged in active warfare and the bureau was receiving daily thousands of applications for insurance, was issuing monthly over a million checks for allotments and family allowances to the dependents of men in the service, and was conducting a vast war-risk insurance business on American vessels, their cargoes, and the lives of their crews. In the fiscal year 1918 the bureau had received comparatively few insurance claims and very few men had been discharged from the military service, so that the investigation of claims for payment of military and naval compensation was not extensive. During the first four months of the fiscal year 1919 the bureau had practically the same conditions to face as during the previous fiscal year with the exception that, as the casualties in the service had become heavier, it became necessary to make plans for the prompt payment of claims for insurance and for military and naval compensation.

But with the signing of the armistice on November 11, 1918, the whole machinery of operation had to be reversed. The bureau ceased to issue marine and seamen's insurance as the risks of war disappeared. Men were discharged from military service and allotments and family allowances which theretofore had gone to their dependents had to be stopped, and the insurance which had been issued on the lives of men in the Army and Navy had to be treated

in an individual way rather than in group. During the war, insurance premiums were deducted from the pay of soldiers, sailors, and marines, but after discharge the men were required to pay their premiums direct to the bureau; therefore it was necessary to set up all the accounting records, notify the men of the date premiums were due, and keep them informed of their privileges under the war-risk insurance act.

As the disabled men were discharged from the military service and filed claims for compensation, the bureau had to make investigations to determine whether they were eligible for the payment of compensation as defined in the act, and make arrangements for their medical treatment and hospitalization, if necessary.

These changes somewhat revolutionized the work of the bureau and constituted a task of very great magnitude.

Organization.

The bureau is now organized in 13 divisions, viz, Insurance Division, Compensation and Claims Division, Actuarial Division, Legal Division, Finance Division, Medical Division, Allotment and Allowance Division, Receipts and Disbursements Division, Liaison Division, Marine and Seamen's Division, Personnel Division, Chief Clerk, and Administration Division.

The Insurance Division controls all the records pertaining to military and naval insurance, including the administration of the work of converting the term insurance policies into the permanent forms of United States Government life insurance. This division keeps a record of the date of discharge of every insured man and of all premium payments made after discharge. It also administers the insurance feature of the soldiers' and sailors' civil relief act. The Compensation and Claims Division receives both death and disability claims for compensation and insurance, obtains the necessary proofs, and makes awards thereon. The Actuarial Division performs the actuarial work of the bureau, prepares statistical reports on insurance and on compensation and insurance claims, and has established work report units in other divisions of the bureau. The Legal Division is the law office of the bureau, and in this division there is also a section which controls the licensing of foreign insurance companies in accordance with the "trading with the enemy act." The Finance Division has charge of the bookkeeping and financial matters of the bureau. The Medical Division is advisory to the Compensation and Claims Division, and through it the Public Health Service provides treatment for disabled men entitled thereto. The Allotment and Allowance Division attends to all matters pertaining to allotments and family allowances. The Receipts and Disbursements Division

sends out all checks for compensation and insurance claims as well as allotments and family allowances. The Liaison Division is the contact division of the bureau and has charge of the publication of all official rulings and bulletins of information and instruction. The Marine and Seamen's Division has charge of insurance on vessels and cargoes and on the lives of seamen in the merchant marine. The Personnel Division makes all appointments and keeps the personnel records of the bureau. The Chief Clerk and the Administration Division have charge of mails, supplies, messengers, and general office work.

The personnel of the bureau increased from 6,703 on July 1, 1918, to 13,771 on July 1, 1919. To obtain this net increase of 7,068 employees it was necessary to make 11,796 appointments. Such a labor turnover means a tremendous expenditure of time and money, due to the period of training which every new employee must undergo. With the reestablishment of more settled conditions in Washington and throughout the country as a whole, it is expected that the rate of turnover will be lessened, the service of the bureau correspondingly improved, and the expenses decreased. The large increase in personnel has been necessary because of the temporary increase in the work due to the demobilization of the military and naval forces, despite the fact that many installations of labor-saving mechanical devices have been made. Of the men at present employed in the bureau, 47 per cent are ex-service men.

In February the first units moved into the new 11-story War Risk Building. By the end of September the number of buildings occupied by the bureau was reduced from 16 to 4. The new building is not large enough, and it is necessary to keep certain divisions in other buildings. At the present time it is planned to consolidate the Insurance Division in the War Risk Building and to place in outlying buildings divisions which are not so large as to prevent lodgment in a single building. The Insurance Division is now housed in four different buildings in widely scattered sections of the city.

Marine and seamen's insurance.

Under the act of September 2, 1914, insurance against war risk was provided for vessels and their cargoes, and under the amendment of June 12, 1917, protection was granted to masters and crews against loss of life, injury, and detention. The writing of marine insurance dates from September 28, 1914, while the first seamen's insurance policy was issued July 3, 1917. The rates for both types of policies were withdrawn on January 4, 1919. There remains only the settlement of unadjusted claims. It was possible to terminate the business of this insurance so soon after the signing of the armistice because protection was provided against the war hazard only.

Marine insurance—Insurance of hulls, cargoes, and freights, Sept. 2, 1914, to Sept. 30, 1919.

Total policies written.....	27, 227
Net insurance written.....	\$2, 067, 406, 428. 00
Net premiums received.....	\$46, 749, 925. 71
Total losses, including estimated unrepresented claims.....	\$29, 915, 643. 71

Seamen's insurance.—Insurance written on masters and seamen, July 3, 1917, to Sept. 30, 1919.

Total policies written.....	6, 157
Net insurance written.....	\$322, 673, 808. 54
Net premiums received.....	\$842, 584. 90
Total losses, including estimated unrepresented claims.....	\$307, 077. 81

Military and naval allotments and family allowances.

Article II of the war-risk insurance act authorizes the bureau to award allowances to the families and to the dependents of enlisted men in the Military and Naval establishments of the United States, provided a monthly allotment of \$15 is made from the pay of the men. All enlisted men in the service were required either to make application for an allowance, which was compulsory for a man having a wife, children, or a former wife divorced and not remarried to whom alimony had been decreed; or to file a statement requesting that no allowance be awarded, which was optional with a man having only dependent parents, brothers, sisters, grandchildren or grandparents. A great many requests for exemption from the compulsory allotment were filed and were granted by the bureau when proper cause was shown.

The allotment and allowance problem during the past year was completely reversed with the signing of the armistice. The Army and Navy sent discharge notices which furnished data enabling the bureau to terminate the allotments and allowances. However, instead of the entire case being closed when a man was discharged, many cases required more attention than if the men had remained in the service. A very large percentage of the men discharged, who had made allotments to their families and who were entitled to allowances, began immediately to correspond with the bureau, making protests regarding the amounts of money received by their dependent relatives and advising the bureau as to what amounts, in their opinions, should have been paid. As a result there has been an enormous amount of correspondence in adjusting and terminating these cases.

Applications and awards for family allowances for the period Oct. 6, 1917, to June 30, 1919.

Applications received.....	4, 391, 094
Number of awards made for men having dependents.....	2, 045, 890
Number of exemption cases submitted.....	100, 156
Amount of allotments paid.....	\$267, 955, 981
Amount of allowances paid.....	\$233, 167, 009

Military and naval compensation.

Compensation for death or for disability incurred while in the military or naval service is payable to a man or his dependents upon the presentation and approval of proofs, provided disability or death was the result of the man's performance of duty and not the result of his own misconduct.

Article III of the war-risk insurance act specifies the amounts of the military and naval compensation benefits. For example, a widow alone receives \$25 per month; a widow with one child, \$35; a totally disabled man with neither wife nor child, \$30; a totally disabled man with wife alone, \$45; and a man losing both feet, both hands, both eyes, or who becomes totally blind, or helpless and permanently bed-ridden, \$100 per month. When the disability is other than total, the degree of disability is determined and the award made on a percentage basis; for example, a man 50 per cent disabled having a wife, would receive \$22.50 per month. The basis for permanent, partial disability at the present time is \$30 per month for a single man. Thus a man who has lost a leg is entitled to from 40 to 70 per cent of \$30 per month. It is hoped that the proposal changing the basis to \$100 per month will become a law.

During the fiscal year 1919 the bureau practically completed the work arising from claims for military and naval compensation because of death. After the armistice and the discharge from the service of the wounded and sick, the number of disability claims increased very rapidly. The law requires that the disabled man submit to a physical examination by a medical officer chosen by the bureau. The Public Health Service has made the majority of these examinations. While the disabled man is receiving compensation he must submit to reexamination as often as requested. To all persons entitled the bureau provides such medical, surgical, and hospital services and prosthetic apparatus as are reasonably necessary.

The following table shows the number of men treated in hospitals, discharged from hospitals, and the number of artificial limbs furnished by the bureau between October 6, 1917, and September 30, 1919:

Cases admitted to hospitals.....	15, 078
Cases discharged from hospitals.....	8, 943
Artificial arms supplied.....	979
Artificial legs supplied.....	1, 103

The medical treatment and hospitalization is done through the Public Health Service.

The bureau is notified by the Army and Navy of deaths and disabilities incurred in the service. These notifications are in the nature

of claims and are so carried on the records of the bureau. Investigation, however, often reveals the fact that there is in reality no dependency and that there is, therefore, no claim. At times men are erroneously reported as dead, relatives frequently can not be found, and communications are occasionally received definitely stating that no claim will be made. The principal reason for disallowing compensation claims on account of the death of men in the service is that the parents are not dependent, the deceased being single men. Frequently there are no dependents entitled to compensation. A few claims have been disallowed because death was not incurred in line of duty or was caused by the willful misconduct of the deceased. The principal reason for disallowing compensation disability claims is that disability is less than 10 per cent of a total disability. There have been a few cases disallowed because disability was not the result of service or because it was the result of willful misconduct.

When the status of parents changes so that they would not be dependent upon the deceased, had he been alive, the payment of compensation is terminated. Widows who remarry and children who attain 18 years of age are not entitled to the continuation of compensation payments. In the majority of cases military and naval compensation awards for disability are terminated either because of recovery from disability, or because of death of the disabled man.

Compensation is payable whether the dependency of the father or mother, or both, arises before or after the death of the person in the service, provided that dependency arises and claim is made within five years of the date of death. Compensation for disability is payable provided a medical certificate is secured within one year after discharge stating that the person at the time of his discharge or release was suffering from injury likely to result in death or disability and provided claim is made within five years after discharge or resignation. Frequently claims which may become compensable in the near future are allowed to remain pending. Similarly any disallowed claim may be reopened when parents become dependent or when the extent of the disability increases.

The delay in the settlement of claims for military and naval compensation because of death is due principally to the necessity of ascertaining from the War and Navy Departments information as to whether death occurred in line of duty, to the time requisite to obtain the return of claim papers properly filled out, or to the inability of the bureau to communicate with the claimants due to their failure to give notice of their change of address. Disability claims are delayed in settlement because of the necessity of securing medical examination and reexamination or because of the lack of completed claim papers.

Table showing number of military and naval compensation cases awarded for death and disability in the period from Oct. 6, 1917, to Sept. 30, 1919.

Claims awarded for death.....	32, 831
Claims awarded for disability.....	71, 757
Total claims awarded for death and disability.....	104, 588

Table showing the amount of monthly payments awarded for military and naval compensation for death and disability in the period from Oct. 6, 1917, to Sept. 30, 1919.

Claims awarded for death.....	\$867, 495. 92
Claims awarded for disability.....	2, 230, 561. 60
Total claims awarded for death and disability.....	3, 098, 057. 52

Table showing number of military and naval compensation cases disallowed for death and disability during the period from Oct. 6, 1917, to Sept. 30, 1919.

Claims disallowed for death.....	56, 193
Claims disallowed for disability.....	11, 896
Total claims disallowed for death and disability.....	68, 089

Military and naval insurance.

The war-risk insurance act provides for the issuance by the United States of insurance against death and total permanent disability to every officer and enlisted man, to every member of the Army Nurse Corps, and to every member of the Navy Nurse Corps when employed in active service under the War or Navy Departments, upon written application to the bureau and the payment of premiums. The following table shows the number of applications, the amount of insurance, and the estimated premium income from date of passage of the war-risk insurance act to June 30, 1919:

Number of applicants for war-risk insurance to June 30, 1919.....	4, 334, 141
Number of applications for war-risk insurance to June 30, 1919.....	4, 520, 178
Total amount of insurance applied for to June 30, 1919.....	\$39, 046, 202, 000
Average amount of insurance per application.....	\$8, 638
Average amount of insurance per applicant.....	\$9, 009
Estimated premium income to June 30, 1919.....	\$295, 000, 000

The following tables give the number and amount of insurance claims actually awarded to September 30, 1919:

Contract and automatic insurance—Number of cases awarded for death and for permanent total disability for the period Oct. 6, 1917, to Sept. 30, 1919.

Contract insurance awards for death.....	110, 446
Automatic insurance awards for death.....	5, 012
Total insurance awards for death.....	115, 458
Contract insurance awards for permanent total disability.....	708
Automatic insurance awards for permanent total disability.....	133
Total insurance awards for permanent total disability.....	841

Total insurance awards for death and for permanent total disability.. 116, 299

Contract and automatic insurance—Amount of insurance upon which awards have been made for death and for permanent total disability for the period Oct. 6 1917, to Sept. 30, 1919.

Contract insurance awards for death.....	\$1, 013, 100, 633. 48	
Automatic insurance awards for death.....	22, 554, 000. 00	
Total insurance awards for death.....		\$1, 035, 654, 633. 48
Contract insurance awards for permanent total disability.....	6, 204, 540. 00	
Automatic insurance awards for permanent, total disability.....	598, 500. 00	
Total insurance awards for permanent total disability.....		6, 803, 040. 00
Total insurance awards for death and for permanent total disability.....		1, 042, 457, 673. 48

The signing of the armistice on November 11, 1918, was quickly followed, as is well known, by the demobilization of the Students' Army Training Corps and other units. It immediately became apparent that the bureau must be informed at once as to every individual discharged to enable it to mark up its insurance records accordingly and get in touch with the ex-service man to inform him of the amount of his insurance premium, the date it became due, and such other facts as were deemed expedient.

A form of notice of discharge was agreed upon by the War and Navy Departments and the bureau, and arrangements were made that when a man was discharged from the service this form would be prepared and sent to the bureau direct and not through military channels. From this information the bureau was in a position to stop the payment of allotments and family allowances to the dependents of discharged men and to prepare the way for ex-service men to pay their premiums direct to the bureau. On the promptness with which these discharge notices were received depended to a large extent the proper functioning of the bureau, and it is to be regretted that in spite of every precaution taken considerable delay occurred in the receipt of these discharge notices from the military services.

Beginning in December, 1918, notices of insurance premiums due were issued, and in January and February hundreds of thousands were sent out. Of these, thousands were returned because of faulty addresses, and the bureau still has to contend with this problem of lack of proper address. However, by cooperation with the Post Office Department this situation constantly is being improved. Coupled with the difficulty of sending out notices which would reach the discharged men was that resulting from the flood of correspondence from these men, asking about their privileges under the war-risk insurance act and their rights to converted insurance. Nearly all the men were unsettled for a month or two after the termination

of military service, and many of them neglected their insurance. Many could not secure employment at once or did not earn enough to allow them to maintain their insurance. Thousands of others never received the premium notices mailed by the bureau. Much insurance was lapsed because the men had taken it out only on account of the danger incident to military service.

There was for a time a lack of information about the methods of paying premiums, the possibility of reducing the amount of policies, and the advantages of war-risk insurance. Many men allowed their insurance to lapse and it was necessary to reach them by an extensive campaign of conservation. The bureau has made every effort to point out to each individual the benefits of Government insurance and to acquaint him with the simple requirements necessary for the reinstatement of lapsed policies. From time to time reinstatement provisions have been liberalized, until now all that is necessary to reinstate insurance within 18 months after discharge is to remit to the bureau two months' premiums to cover, respectively, the grace period of one month during which protection was had, and one month in advance, with the statement that the insured is in as good health as at the time of discharge. It is thought that this recent regulation relative to reinstatement will be the means of saving to the insured and their beneficiaries the protection of millions of dollars of war-risk insurance.

United States Government life insurance.

Section 404 of the war-risk insurance act provides that not later than five years after the date of the termination of the war, as declared by proclamation of the President, the term insurance shall be converted, without medical examination, into such form or forms of insurance as may be prescribed by regulations and as the insured may request. The insurance offered under the provisions of this section of the act is known as United States Government life insurance and protects against death and permanent total disability.

Six forms of insurance are being offered: Ordinary life, 20-payment life, 30-payment life, 20-year endowment, 30-year endowment, and endowment at age 62. The rates of premium are attached to this report. Government insurance is very liberal in that the insured is protected against permanent disability, no matter at what age disability is incurred. Premiums may be paid monthly, quarterly, semiannually, or annually at the election of the insured. The insured will participate in and receive such dividends as may be determined and apportioned by the director, with the approval of the Secretary of the Treasury. These dividends may be taken in cash or left on deposit to accumulate at interest at a rate to be determined by the Secretary of the Treasury.

The new policies provide for most liberal nonforfeiture and loan provisions, including cash surrender value of the full reserve calculated on the American Table of Mortality and $3\frac{1}{2}$ per cent interest at the end of any policy year, or a participating paid-up policy for a less amount, or participating extended term insurance. The insured may borrow from the Government at any time after his policy has been in force one year, and provided his policy is in force, up to 94 per cent of the then cash value on the sole security of his policy. There are no restrictions as to travel, residence, occupation, or military or naval service. Claims are payable in 240 monthly installments of \$5.75 for each \$1,000 of insurance. The proceeds from this insurance are exempt from all taxation and are not assignable or subject to the claims of creditors of the insured or any beneficiary except claims of the United States arising under the war-risk insurance act.

The beneficiary may be changed at any time without the consent of the beneficiary, provided the new beneficiary is a member of the permitted class. Provision is made for payment of a life annuity to the beneficiary with payments for 240 months guaranteed, in lieu of the regular form of settlement.

Without any great effort being made to secure applications for conversion, 36,061 applications for converted insurance were received to September 30, 1919, of which 12,068 applications for \$42,435,500 of insurance have been approved, the average policy being for \$3,516.

Amendments.

Under the war-risk insurance act an enlisted man was compelled to make allotment from his pay in favor of his wife, if any, and might make allotments in favor of certain other dependent persons. In the case of a wife the Government added an allowance, and in certain other cases where a man made an allotment to persons dependent on him for support the Government also made an allowance, but the question of allowance in the latter instances was controlled by the question of dependency upon the enlisted man. When the war-risk insurance act was passed on October 6, 1917, and allotments were deducted from the pay of soldiers and sailors beginning in November, 1917, it became quite apparent that the bureau could not undertake detailed investigations in every instance before checks were sent to dependents of the men in the military and naval service if the payments were to go out promptly. So in a great many cases the bureau issued the checks to the parents of soldiers and sailors in advance of investigation. In the summer of 1918 many investigations of these cases were made, and it was found that in some cases parents were receiving allowances to which they were not entitled under the war-risk insurance act, because they were not dependent. The bureau, therefore, discontinued allowances and, under the law, was compelled to

deduct the previous payments from future remittances. This condition resulted in the amendment to the war-risk insurance act of February 25, 1919, which relieved the bureau of the requirement to seek reimbursement in cases of this kind, except where it is conclusively shown that the person receiving the allowance did not bear the relationship to the enlisted man which is necessary under the act and except in cases of manifest fraud.

An amendment to the Federal vocational rehabilitation act, approved July 11, 1919, authorized the Federal Board for Vocational Education to place disabled persons discharged from the military and naval forces in training without awaiting action by the Bureau of War Risk Insurance on the question of their eligibility to compensation under the provisions of the war-risk insurance act. This eliminated the delay involved in the previous practice requiring the submission of such cases to the Bureau of War Risk Insurance for determination of the question of compensation before undertaking training.

A man who has lost both hands, or both feet, or both eyes, or has been helpless or permanently bedridden, as the result of military or naval service, is entitled to the payment of \$100 per month as compensation for total permanent disability. For cases involving the loss of both hands and both eyes, or both feet and both eyes, or both hands and both feet, the Congress passed an amendment to the act approved August 6, 1919, providing another allowance of \$100 per month for a nurse or attendant, in addition to the \$100 allowed for total permanent disability.

ENEMY OR ALLY OF ENEMY INSURANCE COMPANIES AND OTHER FOREIGN INSURANCE COMPANIES.

The jurisdiction of the Federal Government over foreign insurance companies doing business in the United States has continued during the past year, the Treasury administering the provisions of the trading-with-the-enemy act dealing with the question. From time to time insurance companies already established in foreign countries are applying for licenses to do business in this country. Since October 6, 1917, or the date when the trading-with-the-enemy act went into effect, the Treasury has licensed 12 insurance companies which never before did business in the United States.

SOLDIERS' AND SAILORS' CIVIL RELIEF ACT AND BONDS ISSUED THEREUNDER.

Article IV of the act approved March 8, 1918, entitled "An act to extend protection to the civil rights of members of the Military and Naval Establishments of the United States engaged in the present war," otherwise known as the soldiers' and sailors' civil relief act,

provides that the Government will protect payments of insurance premiums in commercial companies on certain policies on the lives of men in the military and naval services to the extent of \$5,000 insurance on any one life. The law stipulates that the premiums due life insurance companies in such instances shall be certified by the Bureau of War Risk Insurance to the Secretary of the Treasury, and directs that, to secure the payment of such premiums, bonds of the United States shall be issued by the Secretary and registered in the names of the respective insurers. To June 30, 1919, the Bureau of War Risk Insurance approved 7,074 applications for benefits under this law. These approved applications protected \$11,266,633 of insurance in private companies and societies on the lives of men in the military and naval services. The amount of premiums guaranteed was \$326,747.69. Some of the premiums were paid by the insured, and to the extent of such aggregate payments it was unnecessary to issue bonds as a guaranty.

To June 30, 1919, \$179,500 of bonds had been issued to guarantee the payment of such premiums, of which \$100 had been canceled and \$179,400 were outstanding on that date. The issue of bonds by the Secretary of the Treasury upon the certification of the Bureau of War Risk Insurance is covered by Treasury Department Circular No. 115, dated July 1, 1918, which is attached to this report as Exhibit 84, page 473.

CUSTOMS.

During the fiscal year ended June 30, 1919, the effect of the war on international trade made itself felt, and, as in the preceding year, the customs revenues were far below normal. As compared with the fiscal year ended June 30, 1918, however, there was an increase of \$1,390,079 and a decrease of over \$112,000,000 as compared with the fiscal year ended June 30, 1914, immediately prior to the outbreak of the war in Europe.

The aggregate receipts collected by the customs service during the fiscal year 1919 amounted to \$186,241,436. Since the signing of the armistice, however, a considerable increase in customs revenue, as compared with the corresponding period in the preceding fiscal year, is apparent, and it is confidently expected that with the formal restoration of peace the customs dues collected under existing laws will increase to their former proportions, i. e., in the neighborhood of \$300,000,000. The value of imports for 1919 amounted to \$3,091,369,329, an increase of \$146,309,926 over those in 1918, while the exports during the same period amounted to \$7,224,867,829, an increase of \$1,296,582,188 over the exports of 1918, and nearly \$5,000,000,000 greater than the exports reported for the fiscal year 1914.

The expenditures of the customs service during the past fiscal year amounted to \$10,147,576, or an increase of \$138,652 over the fiscal year 1918. Although \$500,000 was added to the regular customs appropriation to defray expenses incident to the enforcement, by the customs authorities, of certain of the provisions of the espionage and trading-with-the-enemy acts, the economical expenditure of this special fund made it possible to return to the treasury an unexpended balance of over \$400,000.

During the past fiscal year, up to the signing of the armistice, the customs service was required to exercise extraordinary vigilance in order to insure the enforcement of the restrictive measures adopted by the Government with respect to the arrival and departure of persons and the importation and exportation of merchandise from and to foreign countries. In fact, during the war period the customs service became a kind of "clearing house" in the enforcement of war-time regulations of several departments and governmental agencies other than the Treasury, notably the State Department, the War Trade Board, and, to a more limited extent, the War Department. That all of these duties were expeditiously and efficiently performed is a tribute to the loyalty and devotion of the field force of the customs service worthy of the recognition and generous consideration of the Government.

During the past fiscal year it has been possible to resume the annual conferences of collectors of customs and appraisers of merchandise which were suspended during the war period. These conferences serve a most useful purpose because of the opportunity which they afford to discuss problems of common interest and to devise plans for the improvement of the service. They serve to strengthen the esprit de corps of the customs service as well as to standardize the methods of administration.

Under a new accounting procedure put into operation throughout the service during the past fiscal year it was possible to abolish the use of 194 forms used under the former system. The new procedure is, furthermore, expected to result in the saving of about half the time and labor formerly necessary at the large naval office ports in recording the transactions and rendering financial reports to the Auditor for the Treasury.

During the past fiscal year considerable work devolved upon customs officers by reason of the enforcement by them of the act of June 7, 1918, commonly known as the motor-boat act. Under that law, collectors of customs are required to see that every motor boat in their districts, except those owned by the Government, is numbered. Not only is it necessary to keep a record of the numbers assigned to every motor boat and the names and addresses of the owners thereof, but subsequent changes of ownership must likewise be recorded and violations reported to the Secretary of Commerce.

The enactment of the recent Federal prohibition law also imposed increased duties on customs officers during the past fiscal year. As soon as the manufacture and sale of liquor in this country was prohibited there was noticeable increased activity along the Mexican and Canadian frontiers in the smuggling of liquors. The special measures adopted to meet the situation, coupled with the severe penalties which have been imposed, will result in a steady decline in violations of this character.

In view of the continued demand for space in Federal buildings, reorganization of the force employed at the various large ports has been made during the past year whereby space formerly devoted to customs purposes has been made available for other Government agencies.

Every effort has been made during the past fiscal year to simplify, within the limits permitted by law, the customs practice and procedure. Furthermore, a number of improvements in the organization of the customs forces were effected with a view to expediting the conduct of public business.

PUBLIC HEALTH.

The period following the termination of hostilities with Germany, no less than during the war, ushered in additional responsibilities of a medical and public health nature which it became the duty of the Federal Government to discharge.

By far the most responsible of these duties is the important work, with which the Public Health Service is charged, of affording medical relief to the discharged heroes of the late war.

After the signing of the armistice, with resultant rapid demobilization, the lack of facilities for providing for the hospital care and treatment of discharged soldiers, sailors, and marines who were beneficiaries of the War Risk Insurance Bureau became so acute that Congress found it necessary to pass legislation to meet the situation. In the act of March 3, 1919, entitled "An act to authorize the Secretary of the Treasury to provide hospital and sanatorium facilities for discharged sick and disabled soldiers, sailors, and marines," provision was made for the acquiring by the Public Health Service of various properties, including hospitals and hospital sites, with equipment, etc., by transfer from the War Department and otherwise. By the end of the fiscal year, therefore, the Public Health Service had opened nine hospitals for this class of beneficiaries. Additional institutions were opened after the expiration of the fiscal year and further facilities will be provided for the future. At the present time virtually all of the beneficiaries of the war risk act are being cared for through the agencies of the Public Health Service.

In addition to caring for our soldiers, sailors, and marines, it was found desirable shortly after the passage of the above-mentioned act to enter into reciprocal arrangements with the Canadian Government whereby discharged soldiers of Canada in the United States are given necessary medical attention at our institutions and American soldiers in Canada are accorded the same privilege in that country.

The better coordination of the medical activities of the Government, so far as they related to the care of the discharged soldier, sailor, and marine, was effected during the past year by the conclusion of arrangements with the Federal Board for Vocational Education whereby medical officers of the Public Health Service are now making physical examinations, upon request of the District vocational officer of that board, of disabled men discharged from the service desiring to enter upon a course of vocational training.

The organization of the forces of the Public Health Service engaged in this relief work is practically completed. With its completion it is hoped to have built a machine of the highest efficiency and having first regard for the welfare of the soldier, sailor, and marine, and to have afforded facilities generally for carrying on what the Public Health Service recognizes to be a tremendously important function. It might be well to mention in connection with the obtaining of personnel for this work that the reserve corps, created by the act of Congress approved October 27, 1918, was of great assistance. Without the flexibility which it permitted in the corps, the service would have been unable to obtain sufficient and competent assistants for this work.

After-the-war program.

Upon the cessation of hostilities, the Public Health Service turned its attention toward the development of a comprehensive program to meet the urgent after-the-war health needs. The record of rejections during the draft showed that over 34 per cent of all draft registrants were rejected by examining boards on account of physical defects and diseases. Studies previously conducted by the service had indicated unmistakably that in large measure these defects and diseases could have been prevented had proper attention been given to them, especially in childhood. Therefore, this unsatisfactory condition of the public health is by no means necessary. Its persistence in the face of the energetic work of many departments and voluntary organizations shows primarily that health work has not been sufficiently organized and coordinated and has not received from governmental authorities the attention that it merits and must have if the country is to make rapid recovery from war losses and to render safe the development of new agricultural and industrial processes.

It is true that preventable disease rates have been lowered in many instances, and significant success has followed campaigns against

isolated diseases and insanitary conditions. The tuberculosis rate has steadily fallen. Typhoid fever has been made a negligible factor, and wherever active intelligent efforts have been made to combat it yellow fever has been kept out of the country. Nevertheless the public at large remains in ignorance of those main principles of health which investigations and practical experience have shown to be necessary for the prevention of disease. It is pitifully evident that such primary facts as the means of spread of typhoid fever and malaria, the effectiveness of smallpox vaccination, and the elementary principles of personal hygiene, such as the care of the teeth, are not known to the public generally. No national, comprehensive campaign, dealing with all phases of the public health, has been conducted. Until that is undertaken the information which the public will have in regard to disease prevention will be fragmentary. The problem is daily being aggravated by the fact that the population of the cities and of the country generally is increasing rapidly, making insanitary conditions more menacing.

In developing a program which will meet urgent national needs in public health, leadership must be assumed by some central authority. The Public Health Service is the natural agency to do so. In the past, under authority of Congress, it has built a sound foundation for the conduct of a national campaign for health by determining minimum standards of health and adequate measures for diminishing the annual toll of lives taken by preventable diseases and insanitary conditions.

The program which the Public Health Service has prepared to meet these urgent needs is comprehensive, dealing particularly with problems of industrial hygiene, rural hygiene, prevention of the diseases of infancy and childhood, water supplies, milk supplies, sewage disposal, malaria, tuberculosis, railway sanitation, municipal sanitation, health standard, health education, collection of morbidity reports, and the organization and training for duty in emergency of the reserve of the Public Health Service.

It is evident that the success of such a program will depend upon the active cooperation of Federal, State, and local health authorities and voluntary organizations to a degree not previously recognized. Experience has shown that this cooperation can best be secured on the Federal-aid extension principle. The service has already been authorized by Congress to carry on rural sanitation demonstrations under that plan, but the appropriations have been wholly inadequate. Additional authority is needed if this principle is to be extended to the entire field of public health. Experience has shown that this is the most feasible plan for obtaining the proper coordination of the activities of Federal, State, and local governments.

While there is grave necessity for strict economy in Government expenditures, it is fruitless and unwise to deny requisite funds for the

important work of the Public Health Service when human lives and the national welfare may depend upon the judicious use of Federal money.

Influenza.

In addition to activities relative to the control of the influenza epidemic, the Public Health Service concentrated efforts on the study of the disease. In view of known epidemiological facts, it is self-evident that the disease is highly communicable. There is a growing feeling that it may be communicable only in its earliest stages, particularly during the period of incubation.

A large amount of work was done to determine the prophylactic value of vaccines made from the influenza bacillus and of vaccines containing this organism together with various organisms which were regarded as secondary invaders and probably as the cause of the pneumonia which so often complicates influenza. The only experiments along these lines on which conclusions may be safely based are those in which a portion of the personnel in a group or in an institution was inoculated a number of days prior to the entrance of infection to the group or to the institution. Under these controlled conditions the vaccines which were tried failed to influence either the morbidity or the mortality of the disease.

PUBLIC BUILDINGS.

After the signing of the armistice, bids were invited for the construction of authorized Federal buildings and extensions, contracts for which had been deferred on account of the imperative needs for labor, material, transportation, and money in the prosecution of the war. It was found impossible, however, to resume building operations to any considerable extent because prices which had been gradually increasing for many months had reached a point where, except in a few isolated instances, the limits of cost fixed by law were insufficient.

This condition, affecting more than 100 buildings, has been brought to the attention of the Congress and estimates have been submitted of the amounts severally needed to be provided by way of increases in limits of cost to enable the department to proceed with the work of construction.

The restriction placed upon the letting of new contracts for the construction of Federal buildings during the war did not involve the suspension of the work of preparing drawings and specifications for buildings already authorized and not under contract, nor did it involve the suspension of construction work on buildings already under contract, and which at the time were in various stages of completion. Construction work, notwithstanding abnormal conditions of the most discouraging sort, was carried forward as rapidly as possi-

ble, with the result that 73 buildings and extensions were completed and made ready for occupancy during the year. On a production basis, and as a continuation of the building program of the preceding three or four years, this represented a rate of progress of a new building or extension every five calendar days.

The Postmaster General having reported to the Treasury that the Postal Service had outgrown many of the Federal buildings, the condition was brought to the attention of the Congress and a list of the buildings, together with estimates of the cost of extending a considerable number of them, has been submitted. Similar estimates for the remaining buildings will be transmitted in the near future.

Contractors' relief act.

When the United States entered the war with Germany on April 6, 1917, there were a large number of buildings under construction, the contracts for which had been awarded on bids prepared before that date. The demands which the war made upon the resources of the country for skilled workmen and materials variously affected these contracts. Priorities given for munitions displaced orders already given for building materials or postponed their being placed, and the commandeering of plants where building materials were being manufactured, together with transportation difficulties and increases in cost of freight, materials, and labor, caused unforeseen delays and expense to contractors. With a view to reimbursing these contractors, their subcontractors, and material men (including sureties who furnished means to enable failing contractors to complete their contracts, or who completed same as sureties), an act entitled "An act for the relief of contractors and subcontractors for the post offices and other buildings and work under the supervision of the Treasury Department, and for other purposes," was passed by the Congress and approved August 25, 1919.

That act provides for the reimbursement of such contractors, subcontractors, material men, and sureties for their increased costs due to war conditions for work performed after April 6, 1917, under Government contracts made or proposals submitted (and afterwards accepted without change in price) prior to that date. Claims must be submitted within three months from the passage of the act. Reimbursement is confined to the actual increased cost, exclusive of profits.

Already a number of claims have been filed, but as the act carried no appropriation for their payment the Treasury has submitted an estimate for an appropriation in an amount believed to be sufficient to care for the claims likely to be perfected soon, and further estimates will be submitted from time to time as funds are required to pay claims as audited.

National Archives Building.

Many of the priceless archives of the Government are exposed to destruction and loss for the want of safe and appropriate storage facilities. The necessity for a building specially designed for the preservation of these valuable records has long been recognized. Under authority conferred by the act of March 4, 1913, an examination has been made of the plans of a number of archives buildings of Europe, outline plans have been prepared and approved, a site selected, and estimates submitted for an appropriation for the land and the construction of the stack portion of the building. If the appropriation is made, work on the National Archives Building will be begun at the earliest practicable moment. The attention of the Congress is respectfully drawn to the very great and urgent need of providing funds for the construction of a building for this important purpose.

COAST GUARD.

Throughout the entire fiscal year 1919 the Coast Guard, in accordance with the provisions of the act of January 28, 1915, continued to operate as a part of the naval forces, and engaged in the prosecution of the war under the direction of the Secretary of the Navy.

The vessels of the Coast Guard rendered most useful service in the carrying out of war operations, and the service personnel were utilized to great advantage in various and important war activities under the direction of the Navy Department. Besides serving on Coast Guard cutters, officers of the service were attached to naval vessels in foreign and domestic waters, were on transport duty, and were assigned to training stations, aviation stations, navy yards, and naval districts. The Coast Guard during the World War maintained its high traditions and performed its war-time duties as part of the military forces of the country with marked credit and distinction.

On September 26, 1918, while escorting a convoy in European waters, the Coast Guard cutter *Tampa* was sunk with all hands in the Bristol Channel by a torpedo from an enemy submarine. Diligent search was made by destroyers in the vicinity of the disaster, but nothing was found but two unrecognizable bodies in sailor's uniform and some small pieces of wreckage. There were on board 8 officers, 4 warrant officers, and 100 enlisted men, all of whom, except the medical officer, belonged to the Coast Guard. Thus, in the performance of their duty, did 112 gallant officers and men give up their lives for their country. With the exception of the loss of the U. S. S. *Cyclops*, with her complement, this is the largest individual loss of life sustained by our naval forces during the war.

The Coast Guard was returned to the jurisdiction of the Treasury on August 28, 1919, by the following Executive order:

EXECUTIVE ORDER.

By virtue of the authority conferred by "An act authorizing the President to co-ordinate or consolidate executive bureaus, agencies, and offices, and for other purposes, in the interest of economy and the more efficient concentration of the Government," approved May 20, 1918, I do hereby make and publish the following order:

The important purposes for which the operation of the Coast Guard was temporarily transferred to the Navy under the act approved January 28, 1915, entitled "An act to create the Coast Guard by combining therein the existing Life-Saving Service and Revenue-Cutter Service" having been accomplished, and, it being for the best interests of the Government and for the efficient service of the Coast Guard in connection with the collection of the revenue that the Coast Guard be under the supervision of the Treasury Department, it is hereby directed that the Coast Guard shall on and after this date operate under the Treasury Department.

WOODROW WILSON.

THE WHITE HOUSE, *August 28, 1919.*

In accordance with the terms of the above order, the Coast Guard has resumed the performance of its peace-time functions under the Treasury.

ANCHORAGE CONTROL.

Under Title 2 of the espionage act, approved June 15, 1917, the Secretary of the Treasury was authorized, subject to the approval of the President, to make and enforce rules and regulations governing the anchorage and movement of vessels, foreign and domestic, in the territorial waters of the United States, and to exercise full control over such vessels while in ports of the United States. Under authority of this act, there was formed a board known as the board on the anchorage and movement of vessels. This board consisted of three members, representing the Treasury, War, and Navy Departments. An officer of the Coast Guard was designated as a representative of the Treasury on this board and also was made chairman. The board designated anchorage grounds at the ports of New York, Philadelphia, Norfolk, San Francisco, and the St. Mary River, and also prescribed regulations governing the movement of vessels in those ports as well as regulations governing the lading and unlading of explosives. The board did not deem it necessary to establish anchorage grounds and regulations governing the lading of explosives at other ports.

The office of captain of the port was created at each of the ports mentioned, except at San Francisco, and a United States Coast Guard officer was designated as captain of the port to enforce the regulations.

Many of the enlisted men and officers of the Coast Guard were engaged in this work and also assisted very materially in the enforcement of other laws and regulations pertaining to the entrance and

departure of persons into and from the United States, and in the search of vessels for contraband goods.

The Coast Guard officers and men also assisted materially in the enforcement of war-time regulations issued by this department pertaining to the operation, licensing, etc., of coastwise and harbor craft.

These special regulations have now been revoked and all of the activities above mentioned have practically ceased except those under the rules and regulations governing the anchorage and movement of vessels and the handling of explosives, which regulations are still in full effect and are being enforced by the officers and men of the Coast Guard.

BUREAU OF ENGRAVING AND PRINTING.

The demands of the Government upon the Bureau of Engraving and Printing during the fiscal year 1919 were the greatest in history. All previous records were broken by the engraving, printing, and delivery of 447,464,105 sheets of finished work, including Liberty bonds, Victory notes, war-savings stamps, thrift stamps, certificates of indebtedness, farm-loan bonds, stamps, and currency. The task was carefully and cheerfully performed by the employees of the bureau, who worked uncomplainingly in day and night shifts. There is no institution in the Government where greater care is necessary than in the Bureau of Engraving and Printing.

Prior to the war the law required the printing of the face of all money on hand plate-printing presses. To meet the emergency needs of the Government the statute was modified so as to authorize the Secretary of the Treasury to plate print currency and securities in whatever manner and by whatever process he deemed necessary. Under this authority, together with the installation of modern machinery and the application of up-to-date methods, the bureau has been equipped to meet the requirements and the necessities of the Government with respect to currency, stamps, and securities.

The bureau's cost-accounting system was improved during the year, and valuable information is now readily available as to the various operations to enable the director to determine definitely the costs of the output. This information is of particular value in connection with the product for which the bureau is reimbursed.

CONTRACTING AND PURCHASING.

As the business of the Government expands, there is an increasing need of centralization under some one authority of the great problem of contracting for and purchasing Government supplies. An initial step in this direction, with respect to contracting for supplies for use primarily by the Government services in Washington, was made by the establishment of the General Supply Committee, but the scope of its work is narrow at best. Within its limited field of

operations it has accomplished something in the reduction of purchase prices, but has left untouched the disadvantages to the public service at large which arise from a diversification of administrative views as to general and special needs and from a similar diversification in the form of the contract obligations assumed under the different branches of the service.

Similarly the establishment of Government fuel yards as authorized by the act of July 1, 1918, was a step in the general direction of centralized control to the advantage of the public service. But again the field of operations was made a limited one and its benefits confined to the branches of the Federal service and the municipal government in the District of Columbia and immediate vicinity.

These measures would seem to cover but a fraction of the general requirements for central control over contracting and purchasing. There is no good reason why the field of operations of a centralized authority of this character should be confined to a lesser territory than that marked by national boundaries, or why the benefits of organization, business judgment, and efficient methods should be employed only locally when the need for them is as widespread as the public service itself. It is thought that the whole needs of the Government in matters of contracting and purchasing, without regard to geographical points at which such needs may arise within the continental limits, could be as well, or better, served by the establishment of a central machinery as can the needs at any given point, such as the District of Columbia.

It can not be questioned that procuring supplies, including contracting for supplies for works of construction and manufactured articles or fabricated materials, is a task single in its nature, and one which would lend itself to central organization properly planned and equipped for its purposes, with a permanent chain of depots and warehouses for supplying expeditiously the requirements of all headquarters and field services. Of nearly equal importance in the advantages to be gained are the two questions of improved efficiency at a lower operating cost and the securing of supplies at lower prices. At present, without previous cooperation, the various branches of the public service are competitors among themselves in the markets which they seek, and their similar needs often operate to increase prices for each other under the general rule of supply and demand. This is an administrative problem of great importance in the interests of economy and efficiency, and I am sure that it will require but a cursory examination of the waste and duplication that inevitably must accompany the present system to make manifest the desirability for some drastic reform along the lines suggested.

The view has been advanced from some quarters that certain branches of service, whose requirements are specialized or highly

technical in character, would not obtain satisfactory results except through their own personnel. It is not seen that this view is tenable upon an analysis of the situation. If technical or expert services are available now in the various establishments of the Government, the same services could be utilized by a central control. The more or less centralized machinery brought into operation by the necessities of the world war may be cited as an answer to objections of this character. In practically all branches of the public service dealing with war activities the business control of technical equipment and its procurement was placed in the hands of others than the technical experts whose knowledge was essential to the design and choice of the equipment itself. Similarly, and more effectively perhaps, a central business control of procurement and distribution in time of peace can avail itself of expert services and technical knowledge wherever found within the Government. The fact that business men from civil life were called upon in a period of urgent haste to undertake the procurement through commercial channels of highly specialized articles of fabrication or manufacture and that their efforts were successfully applied with the cooperation of the technical experts within the service, is a sufficient indication that a central business control of procurement is not incompatible with the control by the appropriate branches of the character and choice of their technical supplies.

Aside from the economies to be derived from the application of good business judgment to purchasing, storing, and distributing, the establishment of a central control would have an influence of the utmost value on the contractual relations of the Government. Under the present divided control these are lacking in the uniformity which should obtain, and for that reason occasion many adjustments by the Treasury in the settlement of legal claims which might be avoided under a proper system of standardization of contract forms and management. The prevailing deficiencies in this respect came into view to an unprecedented degree as a result of recent war activities and have served to bring the subject into fresh and serious consideration. It will be recalled that a condition existed in contract affairs which necessitated legislative action for their adjustment not wholly within the strictly legal obligations of the Government.

It will require a trained and skillful organization, with all the facilities necessary for expansions in periods of emergency, if like experiences are to be avoided in the future. Under the urgency of the moment contract forms were disregarded in features essential to the interests of the Government and in many cases were entirely supplanted by informal agreements, written and oral. Form and procedure imposed by present laws were quite generally disregarded, and often were unknown to the officials drawn from civil life and

charged with the procurement of supplies because of their knowledge of industrial conditions. It is obvious that an established and effective central control, capable of expanding its facilities as circumstances require, would meet emergencies with greater security to the interests of the Government and contractors alike.

In the Government's everyday affairs, however, the need is just as urgent, and a lack of uniformity in the written instruments of contract is not alone responsible for the numerous claims against the Treasury. Faulty form and lack of standardization are supplemented to the disadvantage of the Government and contractors by the uncertainty and differences of construction rendered by administrative officers during the period of fulfillment, by unwarranted administrative acts in contravention of explicit terms of contract, both for and against the interests of contracting parties, and by all the many omissions and commissions which are due to the absence of a single supervision.

It is thought that these and a host of evils not touched upon can best be eradicated by combining in one establishment the adequate authority for contracting and purchasing, with all needed facilities, and unlimited as to its field of operations within the United States. To state it in its simplest form, it is a mere matter of combining in one establishment the classes of business common to all, with proper provision for specialized needs. It is not open to doubt that such action would redound immeasurably to the benefit of the public treasury and relieve all branches of the public service of a burden of duties not now administered satisfactorily to the disbursing and accounting authorities. Nor is it open to doubt that it can be effectively accomplished.

Something might be said of the advantages which would accrue to the public interests from measures which might be designed to cure specific evils alone, such as requiring as separate considerations greater uniformity in contract forms and methods of contracting, a revision of the statutory requirements as to advertising and proposals, and kindred reforms, each desirable in itself. But these would leave unsolved the really big problem presented by the situation as a whole. As has been pointed out in the annual report of the Comptroller of the Treasury, the sums involved are large, the public interests concerned are vital and far-reaching, the administrative and accounting duties are complex and burdensome, and the private interests concerned are equally important, often involving the business success or failure of contractors. The contract requirements of the Government standing alone constitute almost a department of Government in themselves, with their own legal and equitable considerations, and a mass of laws and court decisions surrounding their fulfillment, adjustment, and settlement. The present moment, with the experi-

ences of the war fresh in mind and much data available for consideration, would seem to be a propitious one for the study of all purchasing and contracting needs and the proper establishment of machinery necessary to an efficient, expeditious, and economical fulfillment of those needs for the purposes of both ordinary periods and periods of crisis.

It has been considered whether some action might be taken by executive authority, in the absence of legislative enactment, to bring purchasing and contracting operations as found in the various departments and independent establishments into some sort of correlation for the entire executive branch of the Government, but it is thought that the magnitude of the task and its intimate contact with all agencies of that branch argue for a completeness of control and such legal authority for the step as can be granted by the Congress alone.

A proper regard for economical and efficient administration, its bearings on the public treasury, and the judgment of competent critics all combine to urge the establishment of such an agency as the one proposed. Unlike many projects for which consideration is so often asked, it would unify and tend to contract rather than expand the administration of present activities.

GENERAL SUPPLY COMMITTEE.

In advance of provision for the centralized control of all contracting for and purchasing of supplies for Washington and the field, as recommended above, it is urgently suggested that prompt measures be taken at least to remodel and expand the functions of the General Supply Committee, which at the present time is only an agency of contracting for Government supplies. In the absence of the suggested general legislation, a plan should be evolved under which common supplies required for use by two or more of the executive departments or independent establishments of the Government in Washington would be contracted for, purchased, stored, and distributed through a single bureau. In lieu of the General Supply Committee there should be created a bureau of supplies consisting of three divisions, one of which should include the present general functions of the General Supply Committee, to be known as the division of contracts, the second to be known as the division of purchases, and the third to include the present Division of Property Transfer of the committee and to be known as the division of stores. This would require the maintenance of a suitable warehouse adequately stocked with all articles in common use for distribution to the Government service. The ability to carry in stock various classes of supplies commonly required by the departments would permit the prompt filling of all requests and obviate the necessity for open-market purchases which, to a great extent, exists at the present time. Such a

bureau would be able to buy supplies at opportune seasons and in quantities that undoubtedly would greatly reduce the cost.

With respect to the operations of the General Supply Committee during the fiscal year 1919, the records show that reported purchases by the various Government offices under contracts negotiated by the Secretary of the Treasury through the committee amounted to \$10,321,438.18. As certain establishments are not required by law to report purchases and others failed to report fully, the total amount of purchases during the year probably exceeded \$15,000,000.

After the signing of the armistice, it became apparent that large quantities of office material, supplies, and equipment would become surplus because of the cessation of war activities, and on December 3, 1918, the President, on the recommendation of this department, issued an Executive order directing that surplus material, supplies, and equipment falling into disuse because of the cessation of war activities, or for other reasons, be transferred to the Secretary of the Treasury for reissue to other Government establishments through the General Supply Committee. Under that order the General Supply Committee functions as a clearing house for the executive departments and independent establishments of the Government in the District of Columbia, in that it takes over all the surplus material, supplies, and equipment, classifies, warehouses, repairs, and reissues it from time to time to other governmental establishments as their needs arise. In making purchases from available funds for needed office material, supplies, and equipment the order required the several executive departments and independent establishments and the municipal government of the District of Columbia to buy from the stores of the General Supply Committee if the articles were obtainable from that source.

To carry the order into effect, the Congress granted an appropriation of \$100,000 for the remainder of the fiscal year 1919 and for the fiscal year 1920, and stipulated that the Executive order shall continue in effect until June 30, 1920, without modification, except that proceeds from the transfer of appropriations thereunder shall be covered into the Treasury as miscellaneous receipts.

From December 10, 1918, to June 30, 1919, there was transferred to the General Supply Committee \$1,031,948.54 worth of material, of which \$555,195.34 worth was issued. That amount includes discounts allowed on account of deterioration from use which equaled $15\frac{1}{2}$ per cent. The balance chargeable to stores account was, therefore, \$476,753.20. The total expense of operation; that is, overhead charges, for the period mentioned was \$24,297.30, or $4\frac{3}{10}$ per cent of gross sales.

Section 5 of the act approved July 11, 1919, provided that the heads of the several executive departments and other responsible

officials, in expending appropriations contained in that or any other act, so far as possible, should purchase material, supplies, and equipment, when needed and funds were available, from other services of the Government possessing material, supplies, and equipment no longer required because of the cessation of war activities.

To carry out that provision of the law, the duties of the General Supply Committee were further increased by the Executive order of August 27, 1919, by which the committee was designated as a central body of information with respect to supplies, and, as such, to receive reports of all surplus material, supplies, and equipment available by reason of the cessation of war activities in Government services throughout the United States. Record of material reported as surplus is maintained in the committee for the information of all Government departments and establishments.

There has been transferred to the General Supply Committee, under the Executive order of December 3, 1918, certain motor equipment, which it is unable to sell to other services of the Government. This consists of a number of old and badly worn trucks, automobile bodies, and motor cycles, which it would appear to be to the interest of the Government to sell at public auction. It is, therefore, recommended that the necessary authority be granted to permit the sale of equipment now or hereafter transferred to the General Supply Committee, for which there is no demand, and the sale of which would be in the interest of the Government, and further that, in the case of articles purchased at high prices during the war, the committee be allowed to transfer them to governmental services at a fair market value.

THE INTERNATIONAL HIGH COMMISSION.

The work of the International High Commission has gone on steadily through the fiscal year 1919 with a constantly growing record of accomplishment. With the signing of the armistice and the conclusion of hostilities, it was felt that the time was opportune and appropriate for the holding of a second Pan-American financial conference. Accordingly, at the suggestion of the commission which was established to carry out the recommendations of the first Pan-American conference, the President, through the Secretary of State, has invited the governments of Central and South America again to send their ministers of finance and other appropriate representatives to confer with the Secretary of the Treasury at Washington in January, 1920, on the financial and commercial problems of the American Republics. This second conference will open on January 12 and close on January 17.

Acting under the direction and coordination of the central executive council, the various national sections of the commission are now

engaged in studying a tentative program for the second conference which has been formulated by the council and in assembling data for consideration at that meeting. Careful studies of the public debt, currency system, banking laws and practices, and principal economic requirements of each Republic of Central and South America and the West Indies have been undertaken. The council also is giving particular attention to questions of communication and transportation and has set on foot a detailed investigation of the requirements for the rehabilitation and extension of maritime and land transportation facilities in Latin America. In this connection the council is receiving the hearty cooperation of the Department of Commerce and the United States Shipping Board, which have undertaken special surveys of transportation necessities in order to make the information available for the conference. Data also is being obtained with respect to the cable and wireless situation in Latin America.

The International Trade-Mark Registration Bureau at Habana has advanced still further toward effective operation, and the last obstacles to its actual receipt and registration of trade-marks from the countries of the Northern Group were being cleared up as the fiscal year ended. It is now actively functioning. Our own enjoyment of all the benefits of the trade-mark convention of 1910, so far as it is in effect, was somewhat handicapped during the fiscal year 1919 by the lack of enabling legislation to permit the Commissioner of Patents to open a register for marks communicated to him from the international bureau or bureaus. That difficulty, it is hoped, will be overcome during the present fiscal year.

This convention will serve as a practical device for the better security of the industrial property and good will of manufacturers and exporters not only in the United States, but in all the American Republics. It seeks to make the process of registration simultaneous, expeditious, and inexpensive; it does not affect the substance of domestic trade-mark regulations in any manner. It merely provides that the registrant in any one of the signatory countries may secure through the international bureaus registration in all the other signatory countries, provided there is no inherent obstacle in the nature of his trade-mark or in the technical provisions of the domestic trade-mark law. The rights acquired are not everywhere the same. The registrant is put on an equal footing with the domestic applicant for trade-mark registration in each of the countries to which the international trade-mark bureaus communicate the fact of its international registration. He acquires no greater rights than citizens of those countries, nor any less. He gets as much protection in those countries as their laws afford, just as citizens of those countries acquire as much protection in his country as his domestic law will

grant. It is a notable achievement of the International High Commission to have assisted in removing a cause of uncertainty, delay, and loss in the protection of our foreign commerce, and to have stimulated the commerce of other countries by encouraging the distribution among them of all articles wherein proprietary right and good will constitute important assets.

Associated with the preparation for the financial conference is the study that has been undertaken by the commission of the laws under which corporations and branches of foreign companies may organize or operate in the Republics of Central and South America. This inquiry is in line with the purpose of the commission to study the commercial law of the American Republics in the hope of removing the chief obstacles to closer commercial intercourse and gradually bringing about an approximation to the scientific standards of international commercial law and practice. With that serious object in view, the commission has not ceased to labor for uniformity of the law relating to bills of exchange and checks, bills of lading, warehouse receipts, and conditional sales. The careful consideration of the models proposed for legislation on any of these topics will require, on the part of the national legislatures of Latin America, a by no means inconsiderable period of time, as it has required and still requires in the legislatures of our several States in this country. The council is satisfied, however, with the progress made in this most important field and looks for the gradual acceptance of the rules and standards of practice submitted.

During the year special attention was given by all of the national sections to the two important conventions proposed by the council several years ago, the first relating to an international gold clearance fund and the second having to do with the simplification of regulations governing commercial travelers and their samples (Exhibits 85 and 86, pages 475 and 477). The commercial traveler convention has been signed by the United States and Uruguay, Guatemala, Salvador, Panama, Venezuela and Paraguay. Negotiations with a dozen other countries are now under way. The gold clearance fund convention is also in process of negotiation, although it was not formally signed with any country before the end of the fiscal year.

The commission is endeavoring to popularize the use of the Brussels classification of merchandise for statistical purposes, and to that end has issued a series of bulletins presenting the annual import and export statistics of each of the Republics, arranged in accordance with the Brussels classification and with values expressed in national currencies as well as in the international money of account agreed upon by the commission for this purpose and known as the Panamericano. The Department of Commerce publishes in English the material relating to the United States, while the commission publishes in Spanish and English alike the material relating to the other republics.

At the beginning of the fiscal year 1919, the expenses of the commission were still being defrayed from an appropriation of \$40,000 made in the act approved February 7, 1916. The Sixty-fifth Congress appropriated \$25,000 for the fiscal year 1919. The use of that appropriation, however, did not begin until October, 1918, when the appropriation of 1916 was exhausted. At the close of the fiscal year a balance of \$11,000 reverted to the general fund. For the fiscal year 1920 the Congress has appropriated the sum of \$25,000 for the expenses of the commission. The sum of \$50,000 also has been appropriated for the second Pan American Financial Conference, to remain available until expended.

In order properly to carry on the work of the United States section of the International High Commission during the fiscal year 1921, with due regard for its record of accomplishment and the important matters it has undertaken, it is my conviction that the appropriation made by the Congress should be increased to \$30,000.

During the year 1919 the membership of the United States section of the commission was as follows: The Secretary of the Treasury, chairman; John Bassett Moore, vice chairman; Duncan U. Fletcher, Andrew J. Peters, Paul M. Warburg, Samuel Untermyer, John H. Fahey, and John H. Wigmore. L. S. Rowe, secretary general.

The vacant place on the commission has since been filled by Herbert Fleishhacker, of San Francisco, formerly a member of the Federal Advisory Council and president of the Anglo and London Paris National Bank. The staff of the commission consists of an assistant secretary general, six technical assistants, and a corresponding number of clerical assistants.

SURETY BONDS FOR GOVERNMENT OFFICERS.

The attention of the Congress is directed to the increasing number of bonds required by the Government from its employees. It is estimated that approximately 200,000 employees, including the Postal Service, give fidelity bonds in varying penalties ranging from \$500 for a rural letter carrier to \$500,000 for an assistant treasurer of the United States. Most of these bonds are executed by bonding companies, and the premiums, which are paid by the employees themselves, are fixed within the limitation of the act approved August 5, 1909.

The growth and extent of the business suggest the desirability of considering the establishment of a plan whereby the Government would bond its own employees, who would pay premiums into a mutual fidelity fund to be used for the payment of losses arising under the bonds. This would be a wholly safe and satisfactory way of affording protection to the Government and at the same time undoubtedly reducing the premium charge to employees. In this connection it

should be pointed out that the joint commission of Congress created by the act of August 5, 1909, recommended the creation of a mutual bonding fund as the solution of the Government's bonding problem.

If such a plan be not adopted at this time, attention is called to the work now being done by the Treasury through the supervision exercised over bonding companies writing bonds for Government officers in all departments. The act of March 23, 1910, amending the act of August 13, 1894, merely transferred from the Attorney General to the Secretary of the Treasury the limited supervision provided for under the last-mentioned act, but did not give the Treasury Department any additional supervisory authority over these bonding companies. Reasonable funds should be provided to permit the effective enforcement of the statute by affording facilities for making periodical examinations of the financial condition of bonding companies, thereby securing a larger measure of protection for the Government. A large sum would not be required for this purpose.

Under regulations approved by the Secretary of the Treasury, bonding companies doing business with the Government are not permitted to assume a liability on account of any single risk or bond, with the exception of certain customs and internal-revenue bonds, in excess of 10 per cent of their capital and surplus as fixed by the Treasury Department. While the bonding companies have acquiesced in the rigid enforcement of this 10 per cent limitation, it is believed that the best interests of the Government would be served if appropriate legislation were enacted by the Congress definitely fixing the limit of liability. It is respectfully recommended that the act of March 23, 1910, be amended accordingly.

REPRESENTATION OF TREASURY ON WAR TRADE BOARD.

The Secretary of the Treasury continued during the current year to be represented on the War Trade Board, thus keeping that board in touch with the financial policies of the Treasury Department and securing for the Treasury Department the benefit of full information in regard to the trade and blockade policies of the War Trade Board.

Following the signing of the armistice, the War Trade Board undertook to remove restrictions on trade as rapidly as conditions warranted such removal, and by June 30, 1919, all but a few remnants of those restrictions had been removed. By order of the President, the functions of the War Trade Board were on that date transferred to the Department of State to be administered by the War Trade Board section of the Department of State, and the existence of the War Trade Board came to an end.

I take this occasion to record my judgment of the valuable service performed by that board and my appreciation of its cordial cooperation with this department.

PANAMA CANAL.

The general fund of the Treasury was charged during the fiscal year 1919 with \$12,265,775.08 on account of the Panama Canal, including \$1,726,857.87 for construction work and \$10,538,917.21 for fortifications, maintenance, and miscellaneous expenditures. The general fund was credited during the year with \$6,777,046.55 receipts from tolls, etc., making a net expenditure for the year of \$5,488,728.53. The total amount expended for canal construction, fortifications, maintenance, etc., from the general fund to June 30, 1919, exclusive of reimbursements from sales of bonds, was \$313,474,507.02, while the amounts received from Panama Canal bonds, including premiums thereon, issued in 1907, 1908, 1909, 1911, and 1912 was \$138,600,869.02, making the total expenditures on account of the Panama Canal to the close of the fiscal year 1919 \$452,075,376.04.

CONTINGENT FUND.

I respectfully request that the Congress appropriate for the fiscal year 1921 the sum of \$15,000 as a contingent fund for the Secretary of the Treasury. This amount was asked for the fiscal year 1920, but was not granted.

Out of this fund in previous years improved methods and economies have been effected and duplication of work eliminated.

FINANCES.

The following statements showing receipts, disbursements, estimates, and the condition of the Treasury are submitted:

RECEIPTS AND DISBURSEMENTS.¹

Fiscal year 1919.

The receipts and disbursements of the Government during the fiscal year ended June 30, 1919, were as follows:

(See details on pages 188 to 198.)

GENERAL FUND.

Receipts into the general fund, including trust-fund receipts, but excluding postal revenues:

Customs.....		\$183, 428, 624. 78
Internal revenue—		
Income and excess-profits taxes.....	\$2, 600, 762, 734. 84	
Miscellaneous.....	1, 239, 468, 260. 01	
		3, 840, 230, 994. 85
Sales of public lands.....		1, 404, 705. 12
Miscellaneous.....		622, 539, 527. 71
Total ordinary receipts.....		4, 647, 603, 852. 46

¹ "Disbursements," as used in this statement, in addition to actual expenditures, include unexpended balances to the credit of disbursing officers.

Disbursements,¹ from the general fund for current expenses and capital outlays, including trust-fund disbursements, but excluding postal service paid from postal revenues and Panama Canal disbursements:

For civil establishment—

Legislative establishment.....	\$16,605,836.15	
Executive, proper, including Tariff Commission, War Trade Board, War Industries Board, Alien Property Custodian, and Committee on Public Information.....	21,497,674.97	
State Department.....	20,248,594.49	
Treasury Department proper.....	171,319,616.58	
Bureau of War Risk Insurance.....	² 101,943,693.27	
Public buildings, construction, sites, equipment, and maintenance.....	16,651,372.40	
War Department proper.....	20,162,504.50	
Department of Justice.....	15,216,025.43	
Post Office Department proper.....	2,062,433.96	
Postal deficiencies for prior years..	343,511.15	
Navy Department proper.....	9,773,378.04	
Interior Department proper.....	29,120,861.52	
Department of Agriculture.....	36,888,371.28	
Department of Commerce.....	15,668,534.14	
Department of Labor.....	13,290,490.61	
United States Shipping Board.....	1,871,201,577.51	
Federal control of transportation systems.....	349,238,385.21	
War Finance Corporation.....	295,000,000.00	
Food and Fuel Administrations.....	117,644,584.08	
Council of National Defense.....	554,039.43	
Bureau of Industrial Housing.....	70,483,879.32	
Interstate Commerce Commission...	5,688,651.38	
Federal Trade Commission.....	1,595,737.29	
Federal Board for Vocational Education	3,549,442.64	
Employees' Compensation Commission	1,536,434.80	
Smithsonian Institution and National Museum.....	668,668.06	
Other independent offices.....	6,370,516.00	
District of Columbia.....	16,565,433.74	
		\$3,230,890,247.95

For War Department—

For Military Establishment, as follows—

Support of the Army, \$7,304,078,- 826.17; Military Academy, \$2,434,088.16; fortifications, \$1,863,133,573.18; arsenals, \$13,060,745.32; civilian military training camps, \$1,104,902.84; registration and selection for military service, \$15,037,579.62; military posts and miscella- neous, \$9,674,564.....	9,208,524,279.29
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¹ "Disbursements," as used in this statement, in addition to actual expenditures, include unexpended balances to the credit of disbursing officers.

² Exclusive of allotments of pay.

Disbursements¹ from the general fund for current expenses and capital outlays, including trust-fund disbursements, but excluding postal service paid from postal revenues and Panama Canal disbursements—Continued.

For War Department—Continued.

For rivers and harbors.....	\$33, 078, 306. 32
For war miscellaneous, civil, including national homes, \$4,461,122.80; soldiers' deposit fund, \$755,658.91; cemeteries, parks, claims, etc., \$6,240,017.13.....	11, 456, 798. 84
	¹ \$9, 253, 059, 384. 45

For Naval Establishment, including construction of new vessels, machinery, armament, equipment, improvement at navy yards, and miscellaneous.....	² 2, 009, 272, 388. 53
For Indian Service.....	34, 593, 256. 69
For pensions.....	221, 614, 781. 44
For interest on the public debt.....	615, 867, 337. 32
	15, 365, 297, 396. 38

Add difference arising in adjustment of miscellaneous accounts.....	65, 345. 38
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Total ordinary disbursements.....	15, 365, 362, 741. 76
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Excess of ordinary disbursements.....	10, 717, 758, 889. 30
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Special disbursements:

Purchase of obligations of foreign governments.....	\$3, 477, 850, 265. 56
Purchase of farm-loan bonds.....	96, 662, 398. 59

Total special disbursements.....	3, 574, 512, 664. 15
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Panama Canal:

Receipts from tolls, etc.....	6, 777, 046. 55
Disbursements for canal.....	12, 265, 775. 08

Excess of canal disbursements.....	5, 488, 728. 53
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Excess of disbursements over receipts, exclusive of public debt.....	14, 297, 760, 281. 98
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Public debt—receipts and deposits:

First Liberty loan.....	\$8, 485. 38
Second Liberty loan.....	2, 404. 00
Third Liberty loan.....	932, 106, 419. 03
Fourth Liberty loan.....	6, 959, 504, 587. 00
Victory Liberty loan.....	3, 467, 844, 971. 77
War-savings certificates.....	738, 247, 741. 07
Certificates of indebtedness.....	16, 955, 327, 890. 00
Deposits to retire Federal reserve bank notes and national bank notes.....	22, 644, 757. 50
Deposits for postal-savings bonds.....	289, 260. 00

Total public-debt receipts.....	29, 075, 976, 515. 75
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¹ "Disbursements," as used in this statement, in addition to actual expenditures, include unexpended balances to the credit of disbursing officers.

² Includes allotments of pay.

Public debt—redemptions and purchases:

First Liberty loan, converted at 4½ per cent.....	\$4,003,050.00
Second Liberty loan.....	8,000,000.00
Second Liberty loan, converted at 4½ per cent.....	172,357,600.00
Third Liberty loan.....	201,660,500.00
Fourth Liberty loan.....	165,000,000.00
Loan of 1908–1918.....	63,009,460.00
War-savings certificates.....	134,047,603.63
Certificates of indebtedness.....	15,046,532,900.00
One-year Treasury notes.....	19,150,000.00
Federal reserve bank notes and national bank notes retired.....	23,717,892.50
Miscellaneous redemptions, public debt...	87,003.00
Total public debt disbursements.....	15,837,566,009.13

Excess of public-debt receipts over public-debt disbursements.....	\$13,238,410,506.62
Excess of total disbursements over total receipts.....	1,059,349,775.36

SUMMARY OF GENERAL FUND TRANSACTIONS,

Fiscal year ended June 30, 1919.

	Receipts.	Disbursements.
Ordinary receipts, including trust-fund receipts, but excluding postal revenues.....	\$4,647,603,852.46	
Disbursements ¹ for current expenses and capital outlays, including trust-fund disbursements, but excluding postal service paid from postal revenues and Panama Canal disbursements.....		\$15,365,362,741.76
Special disbursements.....		3,574,512,664.15
Panama Canal receipts, tolls, etc.....	6,777,046.55	
Panama Canal disbursements.....		12,265,775.05
Public debt—receipts and deposits.....	29,075,976,515.75	
Public debt redemptions and purchases.....		15,837,566,009.13
Total receipts into the general fund.....	33,730,357,414.76	
Excess of disbursements over receipts.....	1,059,349,775.36	
Grand totals.....	34,789,707,190.12	34,789,707,190.12
General-fund balances:		
Balance free of current obligations, June 30, 1918.....		1,319,347,364.14
Pay warrants issued in excess of receipts, as above, fiscal year 1919.....	\$1,059,349,775.36	
Deduct increase in disbursing officers' credits, June 30, 1919, over disbursing officers' credits, June 30, 1918.....	794,069,792.42	
		265,279,982.94
		1,054,067,381.20
Deduct increase in matured interest obligations outstanding June 30, 1919, over such obligations outstanding June 30, 1918.....		51,335,339.20
Balance free of current obligations, June 30, 1919.....		1,002,732,042.00

¹ "Disbursements," as used in this statement, in addition to actual expenditures, include unexpended balances to the credit of the disbursing officer.

POSTAL SERVICE.

[Exclusive of Post Office Department proper, which is included in "civil establishment."]

Postal-revenue receipts.....	\$364,847,126.20
Postal service paid from postal revenues.....	362,504,274.24
Excess of receipts.....	2,342,851.96

UNITED STATES NOTES (GREENBACKS).

Issues to replace worn and mutilated notes.....	243,184,000.00
Worn and mutilated notes retired.....	243,184,000.00

The redemptions during the year of the notes unfit for circulation necessitated the issue of a like amount thereof to maintain the outstanding aggregate of the notes as required by law.

GOLD RESERVE FUND.

Balance in reserve fund June 30, 1918.....	\$152,979,025.63
Balance in reserve fund June 30, 1919.....	152,979,025.63

The redemptions of notes for gold from the reserve fund during the year were: United States notes, \$1,506,000.

As the redeemed notes were exchanged each day for gold in the general fund, the reserve was maintained at the fixed sum required by law, including \$2,979,025.63 tax on additional circulation received under act of May 30, 1908.

TRUST FUNDS.

(Held for the redemption of the notes and certificates for which they are respectively pledged.)

Gold coin and bullion.....	\$735,779,491	Gold certificates out-	
Silver dollars.....	169,148,295	standing.....	\$1,550,259,669
Silver dollars, 1890.....	1,745,161	Less amount in the	
		Treasury.....	814,480,178
		Net.....	735,779,491
		Silver certificates out-	
		standing.....	203,943,000
		Less amount in the	
		Treasury.....	34,794,705
		Net.....	169,148,295
		Treasury notes (1890)	
		outstanding.....	1,754,000
		Less amount in the	
		Treasury.....	8,839
		Net.....	1,745,161
	906,672,947		906,672,947

GOLD SETTLEMENT FUND, FEDERAL RESERVE BOARD.

Gold coin.....	\$1,416,086,099.10
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SINKING FUND.

The securities redeemed on account of the sinking fund, included in general-fund disbursements, were as follows:

Fractional currency.....	\$1, 823
One-year notes of 1863.....	30
Funded loan of 1891.....	4, 050
Refunding certificates.....	360
Funded loan of 1907.....	80, 550
Compound-interest notes.....	90
Consols of 1867.....	100
Total.....	87, 003

CONDITION OF THE TREASURY JUNE 30, 1919.

The public debt of the United States at the close of the fiscal year 1919 is set forth in detail, as follows:

Interest-bearing debt:

Loan of 1925, 4 per cent.....	\$118, 489, 900. 00
Consols of 1930, 2 per cent.....	599, 724, 050. 00
Panama Canal loan, 2 per cent.....	74, 901, 580. 00
Panama Canal loan, 3 per cent.....	50, 000, 000. 00
Postal savings bonds, 2½ per cent.....	11, 349, 960. 00
Conversion bonds, 3 per cent.....	28, 894, 500. 00
Certificates of indebtedness.....	3, 624, 983, 490. 00
War savings certificates.....	953, 997, 434. 77
First Liberty loan, 3½ per cent.....	1, 410, 071, 600. 00
First Liberty loan converted, 4 per cent..	167, 792, 750. 00
First Liberty loan converted, 4½ per cent..	403, 440, 100. 00
First-Liberty loan second converted, 4½ per cent.....	3, 492, 050. 00
Second Liberty loan, 4 per cent.....	704, 204, 350. 00
Second Liberty loan converted, 4½ per cent	2, 862, 252, 250. 00
Third Liberty loan, 4½ per cent.....	3, 958, 552, 700. 00
Fourth Liberty loan, 4½ per cent.....	6, 794, 504, 587. 00
Victory Liberty loan, 3½ and 4½ per cent..	3, 467, 844, 971. 77
	<u>\$25, 234, 496, 273. 54</u>

Debt on which interest has ceased:

Funded loan of 1891.....	20, 800. 00
Loan of 1904.....	13, 050. 00
Funded loan of 1907.....	407, 350. 00
Loan of 1908-1918.....	936, 000. 00
Refunding certificates.....	10, 840. 00
Old debt.....	900, 330. 26
Certificates of indebtedness, matured.....	8, 821, 000. 00
	<u>11, 109, 370. 26</u>

Debt bearing no interest:

United States notes (greenbacks).....	346, 681, 016. 00
Bank notes, redemption account.....	35, 830, 457. 00
Old demand notes.....	53, 012. 50
Fractional currency.....	6, 843, 314. 82
	<u>389, 407, 800. 32</u>

Total interest and noninterest bearing debt, exclusive of certificates and notes offset by coin and silver bullion.... 25, 635, 013, 444. 12

CASH IN THE TREASURY JUNE 30, 1919.

[From revised statements.]

Reserve fund:

Gold coin and bullion.....	\$152,979,025.63
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Trust funds:

Gold coin and bullion.....	735,779,491.00
Silver dollars.....	169,148,295.00
Silver dollars of 1890.....	1,745,161.00
	906,672,947.00

Gold settlement fund, Federal Reserve Board:

Gold coin and bullion.....	1,416,086,099.10
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General fund:

In Treasury offices—

Gold coin.....	\$211,596,388.87	
Standard silver dollars.....	56,497,779.00	
United States notes.....	13,818,465.00	
Federal reserve notes.....	44,227,987.50	
Federal reserve bank notes.....	24,421,249.50	
National-bank notes.....	47,161,186.43	
Certified checks on banks.....	155,953.84	
Subsidiary silver coin.....	10,983,939.20	
Minor coin.....	892,802.67	
Silver bullion (at cost).....	16,423,918.22	
Unclassified (unassorted currency, etc.).....	3,490,532.19	
Public debt paid, awaiting reimburse- ment.....	425,940.50	
		430,096,142.92
In Federal land banks.....		500,000.00
In Federal reserve banks.....	55,300,485.16	
In transit.....	30,172,896.09	
		85,473,381.25

In special depositaries—

Account of sales of certificates of in- debtedness.....	905,411,514.76
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In national-bank depositaries—

To credit of Treasurer of the United States.....	41,123,406.30	
To credit of other Government officers.....	11,276,533.88	
In transit.....	9,148,927.09	
		61,548,867.27

In treasury of Philippine Islands—

To credit of Treasurer of the United States.....	7,758,105.57	
To credit of other Government officers.....	1,555,333.91	
		9,313,439.48

In foreign depositaries—

To credit of Treasurer of the United States.....	22,885,165.93
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1,515,228,511.61

Deduct current liabilities—

National-bank note 5 per cent fund.....	\$22,473,804.75
Less notes in process of redemption.....	22,473,804.75

General fund—Continued.

Treasurer's checks outstanding.....	\$605, 856. 76	
Post Office Department balance.....	17, 051, 943. 10	
Board of trustees, Postal Savings System balance.....	7, 743, 397. 88	
Balance to credit of postmasters, clerks of court, etc.....	21, 482, 001. 63	
Undistributed assets of insolvent national banks.....	1, 236, 360. 25	
Deposits for—		
Redemption of Federal reserve notes (5 per cent fund).....	205, 230, 742. 20	
Redemption of Federal reserve bank notes (5 per cent fund).....	9, 534, 850. 00	
Retirement of additional circulating notes, act of May 30, 1908.....	275, 100. 00	
Miscellaneous redemption accounts...	25, 903, 324. 53	
		\$289, 063, 576. 35
Balance in the Treasury, June 30, 1919, as per Financial Statement of the United States Government.....		1, 226, 164, 935. 26
Settlement warrants, coupons, and checks outstanding—		
Treasury warrants.....	7, 199, 695. 03	
Matured interest obligations.....	¹ 80, 145, 012. 72	
Disbursing officers' checks.....	136, 088, 185. 51	
		223, 432, 893. 26

Balance in the Treasury, June 30, 1919, free of
current obligations..... 1, 002, 732, 042. 00

Comparison of receipts, fiscal years 1919 and 1918.

	1919	1918	Increase, 1919.	Decrease, 1919.
Customs.....	\$183, 428, 624. 78	\$182, 758, 988. 71	\$669, 636. 07	.....
Internal revenue:				
Income and excess profits taxes.....	2, 600, 762, 734. 84	2, 838, 999, 894. 28	.....	\$238, 237, 159. 44
Miscellaneous.....	1, 239, 468, 260. 01	857, 043, 590. 53	382, 424, 669. 48	.....
Sales of public lands.....	1, 404, 705. 12	1, 969, 455. 31	.....	564, 750. 19
Consular fees.....	1, 159, 144. 69	1, 249, 574. 21	.....	90, 429. 52
Chinese indemnity.....	.....	269, 679. 76	.....	269, 679. 76
Profits on coinage, bullion de- posits, etc.....	11, 963, 244. 27	22, 484, 686. 35	.....	10, 521, 442. 08
Payment of interest by Paci- fic railways.....	9, 148. 03	14, 458. 63	.....	5, 310. 60
Tax on circulation of national banks.....	3, 806, 646. 42	3, 557, 075. 78	249, 570. 64	.....
Interest on obligations of foreign Governments.....	322, 162, 228. 04	107, 496, 016. 83	214, 666, 211. 21	.....
Principal payments on fore- ign loans.....	7, 570, 000. 00	.....	7, 570, 000. 00	.....
Interest on public deposits.....	23, 709, 714. 84	11, 516, 786. 20	12, 192, 928. 64	.....
Premium on war-risk insur- ance.....	4, 225, 398. 48	34, 348, 312. 25	.....	30, 122, 913. 77
Night services, custom service, Customs fees, fines, penalties, etc.....	286, 929. 93	271, 428. 10	15, 501. 83	.....
Interest on loans to railroad companies.....	1, 345, 687. 89	702, 067. 48	643, 620. 41	.....
Sale of war supplies, War De- partment.....	2, 871, 584. 86	.....	2, 871, 584. 86	.....
Payment by German Gov- ernment under terms of armistice.....	13, 802, 217. 12	.....	13, 802, 217. 12	.....
Sale of German war supplies. Emergency shipping fund, construction of barges, etc.....	18, 123, 929. 81	.....	18, 123, 929. 81	.....
Interest on advance pay- ments to contractors.....	3, 910, 175. 75	.....	3, 910, 175. 75	.....
Donation of royalty on ma- chine guns.....	3, 860, 000. 00	.....	3, 860, 000. 00	.....
	1, 973, 541. 14	.....	1, 973, 541. 14	.....
	716, 884. 75	.....	716, 884. 75	.....

¹ Estimated where complete reports are not available.

Comparison of receipts, fiscal years 1919 and 1918—Continued.

	1919	1918	Increase, 1919.	Decrease, 1919.
Proceeds of militia property lost or destroyed.....	\$28,917.69	\$17,821.47	\$11,096.22	
Earnings of radio service.....	221,131.19	291,903.08		\$70,771.89
Navy hospital and clothing funds, fines, forfeitures, etc.	741,465.47	812,265.23		70,799.76
Sales of ordnance materials, etc.	4,162,016.20	249,916.66	3,912,099.54	
Land fees.....	1,196,570.93	1,191,109.28	5,461.65	
Revenues of national parks.....	133,815.41	168,113.14		34,297.73
Fees on letters patent.....	2,022,770.99	2,100,947.40		78,176.41
Depredations on public lands.	57,061.77	36,295.08	20,766.69	
Deposits for surveying public lands.....	41,092.16	97,068.43		55,976.27
Oregon and California land grant fund.....	155,217.64	320,033.22		164,815.58
Proceeds of town sites, Reclamation Service.....	55,362.49	60,990.56		5,628.07
Forest reserve fund.....	4,512,173.93	3,535,239.40	976,934.53	
Immigrant fund.....	1,175,293.49	1,017,216.43	158,077.06	
Naturalization fees.....	387,795.50	569,491.50		181,696.00
Proceeds of seal and fox skins.	309,803.35	104,194.51	205,608.84	
Alaska fund.....	247,943.63	306,628.49		58,684.86
Judicial fees, fines, penalties, etc.	1,731,360.05	1,146,228.14	585,131.91	
Surplus postal revenues, prior years.....	18,000,000.00	9,557,700.75	8,442,299.25	
Estimated increased postage.	71,906,000.00	39,073,000.00	32,833,000.00	
Sales of Government property.	15,477,857.80	2,104,915.32	13,372,942.48	
Rent of public buildings, grounds, etc.....	3,639,063.52	479,065.70	3,159,997.82	
Sales of lands and buildings.....	238,935.00	275,082.40		36,147.40
Sales to Indians.....	241,577.85	176,199.48	65,378.37	
Franchise tax.....		1,134,234.48		1,134,234.48
District of Columbia, general receipts.....	10,661,285.44	9,939,074.93	722,210.51	
Funds contributed for river and harbor improvements.	2,282,588.00	1,249,125.00	1,033,463.00	
Reimbursements on account of expenditures made for Indian tribes.....	303,624.07	46,988.85	256,635.22	
Assessments on Federal reserve banks, for salaries, etc.....	2,614,778.42	1,496,306.98	1,118,471.44	
Assessments on national banks for expenses of examiners.....	1,065,121.65	1,018,392.13	46,729.52	
Liquidation of capital stock, Federal land banks.....	626,321.00		626,321.00	
Discount on bonds purchased.	22,878,516.48	2,478,943.65	20,399,572.83	
Sale of farm loan bonds.....	6,345,000.00	6,545,000.00		200,000.00
Interest on farm loan bonds.....	3,619,992.25	289,201.84	3,330,790.41	
Miscellaneous.....	4,775,111.21	2,187,583.21	2,587,528.00	
TRUST FUNDS.				
Department of State:				
Miscellaneous trust funds.....	16,239.94	493,416.13		477,176.19
War Department:				
Army deposit funds.....	839,641.16	847,170.61		7,529.45
Soldiers' Home permanent fund.....	714,009.89	577,948.44	136,061.45	
Miscellaneous trust funds.....		1,020.00		1,020.00
Navy Department:				
Navy deposit fund.....	47,029.60	80,409.00		33,379.40
Marine Corps deposit fund.....	99,696.77	228,344.06		128,647.29
Interior Department:				
Proceeds of Indian lands.	2,275,347.37	2,549,723.76		272,376.39
Indian moneys, proceeds of labor.....	13,972,533.67	13,696,842.00	275,691.67	
Miscellaneous trust funds.	56,280.92	492,258.36		435,977.44
Personal funds of patients, St. Elizabeths Hospital.....	77,917.51	56,052.01	21,865.50	
Pension money, St. Elizabeths Hospital.....	75,824.80	69,077.74	6,747.06	
Navy pension fund.....	2,009.09	2,261.86		252.77
District of Columbia:				
Miscellaneous trust-fund deposits.....	545,242.44	437,882.93	107,359.51	
Washington redemption fund.....	196,231.95	195,099.44	1,132.51	
Police and firemen's relief fund.....	165,533.49	141,172.15	24,361.34	
Other trust funds.....	7,241.93	8,858.81		1,616.88
Total.....	4,647,507,145.88	4,172,635,828.46	758,134,207.04	283,262,889.62

Comparison of receipts, fiscal years 1919 and 1918—Continued.

	1919	1918	Increase, 1919.	Decrease, 1919.
TRUST FUNDS—continued.				
District of Columbia—Contd.				
Deduct—				
Moneys covered by warrant in year subsequent to the deposit thereof.....	\$1,638,786.71	\$264,029.43	\$1,374,757.28	.....
Add—	4,645,868,359.17	4,172,371,799.03	756,759,449.76	\$283,262,889.62
Moneys received in fiscal year but not covered by warrant.	1,735,493.29	1,638,786.71	96,706.58	.....
Ordinary receipts....	4,647,603,852.46	4,174,010,585.74	756,856,156.34	283,262,889.62
Panama Canal:				
Receipts from tolls, etc....	6,777,046.55	6,414,570.25	362,476.30	.....
Public debt:				
First Liberty loan.....	8,485.38	523,112,200.01	.....	523,103,714.63
Second Liberty loan.....	2,404.00	3,807,863,516.00	.....	3,807,861,112.00
Third Liberty loan.....	932,106,419.03	3,243,045,138.47	.....	2,310,938,719.44
Fourth Liberty loan.....	6,959,504,587.00	.....	6,959,504,587.00	.....
Victory Liberty loan.....	3,467,844,971.77	.....	3,467,844,971.77	.....
Certificates of indebtedness.....	16,955,327,890.00	9,017,648,500.00	7,937,679,390.00	.....
War-savings certificates..	738,247,741.07	352,769,265.13	385,478,475.94	.....
One-year Treasury notes.....	.....	19,150,000.00	.....	19,150,000.00
Postal savings bonds.....	289,260.00	1,020,940.00	.....	731,680.00
Bank-note fund.....	22,644,757.50	10,279,650.00	12,365,107.50	.....
Public debt receipts....	29,075,976,515.75	16,974,889,209.61	18,762,872,532.21	6,661,785,226.07
Total receipts, exclusive of postal.....	33,730,357,414.76	21,155,314,365.60	19,520,091,164.85	6,945,048,115.69
Postal revenues.....	364,847,126.20	344,475,962.24	20,371,163.96	.....
Total receipts, including postal.....	34,095,204,540.96	21,499,790,327.84	19,540,462,328.81	6,945,048,115.69

Comparison of disbursements, ¹ fiscal years 1919 and 1918.

	1919	1918	Increase, 1919.	Decrease, 1919.
CIVIL ESTABLISHMENT.				
Legislative:				
Senate.....	\$2,034,463.06	\$1,944,762.48	\$89,700.58	.....
House of Representatives.....	5,303,885.99	5,331,470.93	.....	\$27,584.94
Legislative, miscellaneous	232,614.23	338,291.10	.....	105,676.87
Public Printer.....	8,232,838.68	7,682,847.65	549,991.03	.....
Library of Congress.....	742,153.31	692,345.73	49,807.58	.....
Botanic Garden.....	59,880.88	52,334.80	7,546.08	.....
Total legislative.....	16,605,836.15	16,042,052.69	697,045.27	133,261.81
Executive proper:				
Salaries and expenses....	220,053.26	245,848.07	.....	25,794.81
Relief, etc., American citizens in Europe.....	79,581.58	102,760.66	.....	23,179.08
European food relief.....	47,697.37	.....	47,697.37	.....
United States Tariff Commission.....	199,578.35	191,872.83	7,705.52	.....
Temporary government for West Indian Islands.....	200,000.00	.....	200,000.00	.....
National security and defense, executive.....	7,703,083.69	7,283,577.84	419,505.85	.....
Bureau of Efficiency.....	104,555.04	101,165.80	3,389.24	.....
Civil Service Commission.....	715,954.04	617,550.42	98,403.62	.....
Expenses, trading with the enemy act.....	.....	360,000.00	.....	360,000.00
Alien Property Custodian.....	1,179,018.29	218,530.30	960,487.99	.....
War Trade Board.....	6,369,671.35	701,289.59	5,668,381.76	.....

¹ "Disbursements," as used in these tables, in addition to actual expenditures, include unexpended balances to the credit of disbursing officers.

Comparison of disbursements,¹ fiscal years 1919 and 1918—Continued.

	1919	1918	Increase, 1919.	Decrease, 1919.
CIVIL ESTABLISHMENT—con.				
Executive proper—Con.				
War Industries Board....	\$1,939,141.37	-----	\$1,939,141.37	-----
Committee on Public Information.....	2,739,340.63	-----	2,739,340.63	-----
Total executive proper..	21,497,674.97	\$9,822,595.51	12,084,053.35	\$408,973.89
Department of State:				
Salaries and expenses....	1,036,168.73	637,097.75	399,070.98	-----
Foreign intercourse—				
Diplomatic salaries....	1,282,029.96	920,935.47	361,094.49	-----
Consular salaries.....	2,196,842.98	1,632,835.25	564,007.73	-----
Contingent expenses of foreign missions..	1,170,698.47	1,089,306.39	81,392.08	-----
Post allowances.....	772,388.27	233,051.66	539,336.61	-----
Contingencies of consulates.....	1,099,458.45	662,641.46	436,816.99	-----
Emergencies arising in the Diplomatic and Consular Service.....	272,439.34	223,739.64	48,699.70	-----
Relief of American citizens in Mexico and Germany.....	113,437.51	56,149.73	57,287.78	-----
Representation of interests of foreign governments.....	19,218.84	2,141.87	17,076.97	-----
Relief of American seamen.....	113,470.11	117,177.45	-----	3,707.34
Payment to Panama.....	250,000.00	250,000.00	-----	-----
Payment to Republic of Nicaragua.....	-----	2,750,000.00	-----	2,750,000.00
National security and defense.....	11,358,857.41	942,026.77	10,416,830.64	-----
Miscellaneous items.....	550,337.31	438,803.95	111,533.36	-----
Trust funds.....	13,247.11	753,371.19	-----	740,124.08
Total Department of State.....	20,248,594.49	10,709,278.58	13,033,147.33	3,493,831.42
Treasury Department:				
Salaries, Secretary's office and divisions thereof..	928,099.08	658,187.44	269,911.54	-----
Contingent fund for Secretary.....	3,674.75	7,608.26	-----	3,933.51
International High Commission.....	17,992.16	9,372.63	8,619.53	-----
Contingent expenses of department.....	497,215.19	331,026.86	166,188.33	-----
Customs Service—				
Collecting customs revenues.....	10,174,397.04	9,780,048.18	394,348.86	-----
National security and defense.....	-----	131,305.31	-----	131,305.31
Refunding excess of deposits.....	4,059,021.46	3,610,706.96	448,314.50	-----
Debentures or drawbacks.....	7,953,233.41	12,063,204.34	-----	4,109,970.93
Compensation in lieu of moieties.....	6,355.00	9,941.58	-----	3,586.58
Miscellaneous refunds.....	8,336.76	11,439.41	-----	3,102.65
Internal Revenue Service—				
Expenses of collecting.....	20,149,911.83	12,091,679.99	8,058,231.84	-----
Refunds and reliefs.....	9,997,134.91	3,526,742.89	6,470,392.02	-----
Miscellaneous.....	299,415.18	587,851.16	-----	288,435.98
Suppressing counterfeiting and other crimes.....	292,381.11	232,835.99	59,545.12	-----
Accounting offices.....	2,908,621.96	2,067,906.51	840,715.45	-----
Miscellaneous offices.....	1,249,764.27	1,102,355.86	147,408.41	-----
Public Health Service.....	6,286,720.75	3,183,038.62	3,103,682.13	-----
Epidemic diseases.....	183,554.30	267,758.45	-----	84,204.15
Promoting health of military forces.....	47,153.43	450,102.12	-----	402,948.69

¹ "Disbursements," as used in these tables, in addition to actual expenditures, include unexpended balances to the credit of the disbursing officers.

Comparison of disbursements,¹ fiscal years 1919 and 1918—Continued.

	1919	1918	Increase, 1919.	Decrease, 1919.
CIVIL ESTABLISHMENT—con.				
Treasury Department—Con.				
War Risk Insurance ² —				
Salaries and expenses.	\$12,872,729.78	\$1,768,393.56	\$11,104,336.22	
Losses.	7,499,346.96	22,771,326.05		-\$15,271,979.09
Military and naval compensation.	11,493,837.10	545,012.91	10,948,824.19	
Military and naval family allowance.	193,444,460.92	42,249,935.50	151,194,525.42	
Military and naval insurance.	³ 126,430,622.28	³ 329,757.54		126,760,379.82
National security and defense.	3,063,940.79	1,198,137.84	1,865,802.95	
Federal Farm Loan Board—				
Salaries and expenses.	212,673.00	200,654.05	12,018.95	
Engraving and printing.	5,326,285.79	4,188,670.41	1,137,615.38	
Paper, etc., for United States securities.	662,659.53	508,284.20	154,375.33	
Preparation and issue of Federal reserve notes.	291,522.71	19,481.02	272,041.69	
Expenses of loans.	28,594,377.10	9,716,951.78	18,877,425.32	
Charges on bullion sold.	497,290.09		497,290.09	
Loss on silver dollars melted or broken up.	43,850,645.28	15,465,585.18	28,385,060.10	
Coast Guard.	11,207,131.15	6,819,392.04	4,387,739.11	
Revenue vessels.	289,023.95	42,931.88	246,092.07	
Independent Treasury.	636,253.40	640,607.22		4,353.82
Mints and assay offices.	1,552,793.67	1,769,947.82		217,154.15
Public buildings—				
Sites, construction, and equipment.	10,184,242.67	12,206,527.03		2,022,284.36
Current maintenance.	6,672,167.18	6,180,498.99	491,668.19	
Expositions.		6,971.65		6,971.65
Salaries and expenses, national bank examiners.	1,031,356.85	1,006,208.37	25,148.48	
National security and defense.	5,259,195.75	160,535.57	5,098,660.18	
Increase of compensation.	3,747,009.01	1,717,754.78	2,029,254.23	
Miscellaneous items.	638,010.58	263,202.11	374,808.47	
Special funds—				
Philippine special funds.	1,016,861.61	637,262.16	379,599.45	
Night services, Customs Service.	284,986.04	271,178.24	13,807.80	
Porto Rico special funds.	953,521.03	1,039,685.40		86,164.37
Total Treasury Department.	289,914,682.25	181,848,005.86	257,463,451.45	149,396,775.06
War Department:				
Salaries and expenses.	3,481,678.48	4,143,499.72		661,821.24
Additional employees.	14,951,889.70	8,865,434.70	6,086,455.00	
Temporary office buildings.		4,475,484.11		4,475,484.11
Public buildings and grounds.	682,674.03	638,115.63	44,558.40	
Increase of compensation.	1,046,262.29	110,932.59	935,329.70	
Total War Department.	20,162,504.50	18,233,466.75	7,066,343.10	5,137,305.35
Navy Department:				
Salaries and expenses.	1,682,031.80	1,351,812.67	330,219.13	
Additional employees.	1,102,402.48	433,381.10	669,021.38	
Temporary office buildings.	6,844,007.03		6,844,007.03	
Increase of compensation.	144,936.73	49,420.00	95,516.73	
Total Navy Department.	9,773,378.04	1,834,613.77	7,938,764.27	

¹ "Disbursements," as used in these tables, in addition to actual expenditure, include unexpended balances to the credit of the disbursing officers.

² Exclusive of allotments of pay.

³ Excess of repayments.

Comparison of disbursements,¹ fiscal years 1919 and 1918—Continued.

	1919	1918	Increase, 1919.	Decrease, 1919.
CIVIL ESTABLISHMENT—con.				
Interior Department:				
Salaries and expenses, office of Secretary.....	\$1,139,707.02	\$1,012,079.75	\$127,627.27	-----
General Land Office.....	676,455.17	642,801.57	33,653.60	-----
Public Lands Service.....	2,421,560.86	2,391,607.12	29,953.74	-----
Payment of unpaid taxes on lands involved in Oregon & California R. R. forfeiture suit.....	25,234.81	1,504,841.60	-----	\$1,479,606.79
National security and defense.....	396,921.80	184,195.72	212,726.08	-----
Indian Office.....	297,068.98	305,394.77	-----	8,325.79
Pension Office.....	1,302,962.94	1,411,407.17	-----	108,444.23
Patent Office.....	1,505,618.40	1,511,044.01	-----	5,425.61
Bureau of Education.....	333,648.83	333,133.78	50,515.05	-----
Colleges for agriculture and the mechanic arts.....	2,500,000.00	2,500,000.00	-----	-----
Geological Survey.....	1,232,711.19	1,700,150.66	-----	407,439.47
Bureau of Mines.....	1,582,573.27	1,259,650.84	322,922.43	-----
Fuel yards, District of Columbia.....	1,077,409.22	-----	1,077,409.22	-----
Office of Superintendent of Capitol Building and Grounds.....	1,042,117.89	899,155.16	142,962.73	-----
National parks.....	765,481.46	575,017.01	190,464.45	-----
Territorial governments.....	103,568.75	23,767.63	79,801.12	-----
St. Elizabeth's Hospital.....	694,351.38	412,058.92	282,292.46	-----
Other beneficiaries.....	292,227.71	381,926.64	-----	89,698.93
Construction, etc., of railroads in Alaska.....	5,284,698.43	11,535,605.26	-----	6,250,906.83
Increase of compensation.....	1,046,571.90	742,253.68	304,318.22	-----
Miscellaneous items.....	652,798.91	168,402.70	484,396.21	-----
Special funds—				
Reclamation fund.....	4,209,530.59	5,205,480.25	-----	995,949.66
Five, three, and two percent funds, sales of lands.....	85,073.42	77,642.01	7,431.41	-----
Proceeds, town sites, Alaska.....	24,008.87	-----	24,008.87	-----
Revenues of national parks and Hot Springs, Ark.....	83,985.67	264,195.66	-----	180,209.99
Deposits for surveying public lands.....	63,064.24	70,195.66	-----	7,131.42
Public schools, Alaska fund.....	49,667.14	45,989.57	3,677.57	-----
Miscellaneous trust funds.....	121,842.67	113,823.38	8,019.29	-----
Total Interior Department.....	29,120,861.52	35,271,820.52	3,382,179.72	9,533,138.72
Post Office Department:				
Salaries and expenses.....	1,763,754.67	1,657,353.33	106,401.34	-----
Deficiency in postal revenues.....	343,511.15	2,221,094.54	-----	1,877,583.39
Increase of compensation.....	151,718.46	88,500.00	63,218.46	-----
Miscellaneous items.....	146,960.83	188,467.11	-----	41,506.28
Total Post Office Department.....	2,405,945.11	4,155,414.98	169,619.80	1,919,089.67
Department of Agriculture:				
Salaries and miscellaneous.....	6,643,142.93	6,428,449.68	214,693.25	-----
Animal Industry, expenses.....	3,164,127.56	2,693,854.94	470,272.62	-----
Meat inspection, Animal Industry.....	3,470,027.85	3,491,549.92	-----	21,522.07
Entomology, expenses.....	894,971.74	747,828.39	147,143.35	-----
Soils, expenses.....	367,990.17	378,276.00	-----	10,285.83
Markets, expenses.....	1,619,599.58	1,287,733.52	331,866.06	-----
Plant Industry, expenses.....	2,165,105.26	2,099,749.88	65,355.38	-----
Purchase of seeds.....	235,991.89	245,270.98	-----	9,279.09
Biological Survey, expenses.....	501,639.72	544,512.37	-----	42,872.65
Crop Estimates, expenses.....	222,944.42	206,818.09	16,126.33	-----
Procuring, etc., nitrate of soda.....	\$10,834,614.49	6,828,000.00	-----	17,662,614.49
Public Roads, expenses.....	435,522.06	467,323.41	-----	31,801.35

¹ "Disbursements," as used in these tables, in addition to actual expenditure, include unexpended balances to the credit of the disbursing officers.

² Excess of repayments.

Comparison of disbursements,¹ fiscal years 1919 and 1918—Continued.

	1919	1918	Increase, 1919.	Decrease, 1919.
CIVIL ESTABLISHMENT—con.				
Department of Agriculture—Continued.				
Stimulating agriculture and facilitating distribution of products.....	\$8,377,361.94	\$6,349,055.19	\$2,028,306.75	
Forest Service.....	3,296,563.89	4,203,841.76		\$907,277.87
Acquisition of lands for protection of watersheds, navigable streams.....	1,151,169.40	867,636.14	283,533.26	
Cooperative construction, rural post roads, etc.....	3,665,693.92	843,474.49	2,822,219.43	
National security and defense.....	872,868.68		872,868.68	
Bureau of Chemistry.....	818,474.74	806,745.21	11,729.53	
States Relation Service, expenses.....	2,916,336.05	2,820,355.06	95,980.99	
Cooperative extension work.....	2,568,066.29	2,075,054.37	493,011.92	
Weather Bureau, expenses.....	1,523,035.18	1,461,985.17	61,050.01	
Increase of compensation.....	1,164,160.68	686,156.00	478,004.68	
Cooperative work, Forest Service.....	421,269.86	88,917.96	332,351.90	
Special funds—				
Payments to States and Territories from National Forests fund.....	876,334.39	848,874.01	27,460.38	
Roads and trails for States.....	280,459.13	226,127.99	54,331.14	
Miscellaneous special funds.....	70,128.44	61,870.93	8,257.51	
Total Department of Agriculture.....	36,888,371.28	46,759,461.46	8,814,563.17	18,685,653.35
Department of Commerce:				
Salaries and expenses.....	370,786.74	359,176.20	11,610.54	
Bureau of Standards.....	1,593,100.15	1,378,390.93	214,709.22	
Census Office.....	1,121,351.36	1,184,192.61		62,841.25
Foreign and Domestic Commerce.....	504,902.58	456,749.15	48,153.43	
Coast and Geodetic Survey.....	1,002,802.93	1,116,029.77		113,226.84
Lighthouse Establishment.....	6,662,179.05	5,588,181.29	1,073,997.76	
Bureau of Fisheries.....	1,029,189.00	1,105,703.54		76,514.54
Bureau of Navigation.....	216,820.83	226,053.92		9,233.09
National security and defense.....	1,734,705.08	755,696.73	979,008.35	
Increase of compensation.....	635,372.69	449,871.15	185,501.54	
Fish hatcheries.....	10,412.97	32,698.10		22,185.13
Steamboat - Inspection Service.....	782,795.45	647,143.89	135,651.56	
Miscellaneous items.....	4,115.31	1,369.21	2,746.10	
Total Department of Commerce.....	15,668,534.14	13,301,156.49	2,651,378.50	284,000.85
Department of Labor:				
Salaries and expenses.....	225,838.78	200,842.96	24,995.82	
Bureau of Labor Statistics.....	419,242.89	388,475.89	30,767.00	
Bureau of Naturalization.....	720,243.45	382,566.97	337,676.48	
Bureau of Immigration.....	132,984.13	857,525.45		724,541.32
Regulating immigration.....	2,550,117.13	2,647,574.86		97,457.73
Immigrant stations.....	231,918.03	212,104.88	19,813.15	
Children's Bureau.....	318,435.87	312,757.23	5,678.64	
National Security and Defense.....	1,968,708.53	584,033.85	1,384,674.68	
War Emergency Employment Service.....	5,480,201.23	189,947.37	5,290,253.86	
War Labor Administration.....	1,022,474.06		1,022,474.06	
Increase of compensation.....	220,020.26	140,786.24	79,234.02	
Miscellaneous.....	306.25	265.75	40.50	
Total Department of Labor.....	13,290,490.61	5,916,881.45	8,195,608.21	821,999.05

¹ "Disbursements," as used in these tables, in addition to actual expenditures, include unexpended balances to the credit of disbursing officers.

Comparison of disbursements,¹ fiscal years 1919 and 1918—Continued.

	1919	1918	Increase, 1919.	Decrease, 1919.
CIVIL ESTABLISHMENT—CON.				
Department of Justice:				
Salaries and expenses.....	\$905,910.27	\$987,762.47	.....	\$81,852.20
Salaries of justices, assistant attorneys, etc.....	1,896,459.41	1,795,055.26	\$101,404.15	.....
Court of Claims.....	71,555.70	72,390.67	.....	834.97
National security and defense.....	1,435,210.38	1,413,090.19	22,120.19	.....
Salaries, fees, etc., of marshals.....	1,728,280.20	1,586,523.10	141,761.10	.....
Fees of witnesses.....	1,160,475.50	1,134,651.08	25,824.42	.....
Salaries and fees, district attorneys.....	690,227.42	659,531.68	30,695.74	.....
Fees of jurors.....	1,191,395.76	1,109,066.94	82,328.82	.....
Fees of clerks.....	315,112.37	226,400.10	88,712.27	.....
Fees of commissioners.....	284,435.85	267,764.51	16,671.34	.....
Support of prisoners.....	706,970.56	728,797.17	.....	21,826.61
Pay of bailiffs.....	244,127.65	224,624.69	19,502.96	.....
Miscellaneous expenses, United States courts.....	467,801.94	421,194.56	46,607.38	.....
Detection and prosecution of crimes.....	2,000,836.07	1,180,428.89	820,407.18	.....
Penitentiaries.....	1,520,697.93	982,631.29	538,066.64	.....
Increase of compensation.....	309,423.65	177,372.17	132,051.48	.....
Miscellaneous items.....	287,100.77	265,096.02	22,004.75	.....
Total Department of Justice.....	15,216,025.43	13,232,380.79	2,083,644.64	104,513.78
Independent bureaus and offices:				
Interstate Commerce Commission.....	5,688,651.38	5,399,618.66	289,032.72	.....
Federal control of transportation systems.....	349,238,385.21	150,000,000.00	199,238,385.21	.....
Smithsonian Institution.....	197,419.22	185,560.78	11,858.44	.....
National Museum.....	359,233.70	384,362.03	.....	25,128.33
Zoological Park.....	112,015.14	95,806.00	16,209.14	.....
Salaries, etc., Federal Reserve Board.....	2,331,760.03	1,532,015.17	799,744.86	.....
Council of National Defense.....	554,039.43	1,093,858.55	.....	539,819.12
War Finance Corporation.....	296,000,000.00	55,000,000.00	240,000,000.00	.....
Capital Issues Committee.....	142,402.31	10,000.00	132,402.31	.....
Advisory Committee for Aeronautics.....	228,497.80	80,900.65	147,597.15	.....
United States Employees' Compensation Commission.....	1,536,434.80	719,936.26	816,498.54	.....
Board for Vocational Education.....	3,549,442.64	1,412,882.74	2,136,559.90	.....
United States Shipping Board—				
Salaries and expenses.....	797,280.67	391,535.18	405,745.49	.....
Permanent fund.....	.....	44,000,000.00	.....	44,000,000.00
Emergency shipping fund.....	1,865,715,419.34	807,575,773.73	1,058,139,645.61	.....
National security and defense.....	4,688,877.50	10,059,580.43	.....	5,370,702.93
Food and Fuel Administrations—				
Salaries and expenses.....	7,133,467.03	2,643,026.36	4,490,440.67	.....
Control of food and fuel.....	100,000,000.00	50,000,000.00	50,000,000.00	.....
National security and defense.....	10,511,117.05	2,687,649.39	7,823,467.66	.....
Bureau of Industrial Housing and Transportation.....	70,483,879.32	25,000.00	70,458,879.32	.....
Interdepartmental Social Hygiene Board.....	1,720,122.93	.....	1,720,122.93	.....
Exports Administrative Board.....	.....	250,000.00	.....	250,000.00
Federal Trade Commission.....	1,595,737.29	1,466,423.65	129,313.64	.....
State, War, and Navy Department Buildings.....	1,662,668.93	451,004.40	1,211,664.53	.....
Special fund, Alaskan relief.....	18,753.95	24,801.80	.....	6,047.85
Other independent offices.....	266,310.05	344,205.91	.....	77,895.86
Total independent bureaus and offices.....	2,723,531,915.72	1,135,833,941.69	1,637,967,964.03	50,269,594.09

¹ "Disbursements," as used in these tables, in addition to actual expenditures, include unexpended balances to the credit of disbursing officers.

Comparison of disbursements,¹ fiscal years 1919 and 1918—Continued.

	1919	1918	Increase, 1919.	Decrease, 1919.
CIVIL ESTABLISHMENT—con.				
District of Columbia:				
Salaries and expenses.....	\$14,745,056.78	\$12,921,524.51	\$1,823,532.27	.....
Special funds—				
Water department.....	558,680.17	537,996.75	20,683.42	.....
Washington Aqueduct.....	233,028.18	188,605.28	44,422.90	.....
Miscellaneous special funds.....	53,471.15	3,443.14	50,028.01	.....
Trust funds—				
Miscellaneous trust-fund deposits.....	601,673.35	414,493.43	187,179.92	.....
Washington redemption fund.....	201,473.05	183,251.17	15,221.88	.....
Police and firemen's relief fund.....	164,736.57	135,238.11	29,498.46	.....
Other trust funds.....	7,314.49	18,858.36	.....	\$11,543.87
Total District of Columbia.....	16,565,433.74	14,406,410.75	2,170,566.86	11,543.87
Total civil establishment.....	3,230,890,247.95	1,507,367,481.29	1,963,722,447.57	240,199,680.91
WAR DEPARTMENT.				
<i>Military Establishment.</i>				
Quartermaster Corps.....	4,217,681,223.60	2,336,259,761.87	1,881,421,461.73	.....
Pay, etc., of the Army ¹	1,487,081,171.25	797,460,465.13	689,620,706.12	.....
Medical Department.....	187,503,697.17	110,390,044.08	77,113,653.09	.....
Ordnance Department.....	2,390,296,943.61	1,663,199,383.09	727,097,560.52	.....
Engineer Department.....	355,260,488.11	264,243,520.89	91,016,967.22	.....
Signal Service.....	67,138,834.66	67,210,410.36	.....	71,575.70
Aviation.....	479,281,370.08	336,331,468.60	142,949,901.48	.....
Military Academy.....	2,434,088.16	1,211,737.93	1,222,350.23	.....
Military posts.....	3,337,820.41	7,025,599.01	.....	3,687,778.60
National Guard.....	² 3,980,711.08	39,609,063.34	.....	43,589,774.42
Civilian military training camps.....	1,104,902.84	5,290,124.59	.....	4,185,221.75
Registration and selection for military service.....	15,037,579.62	13,517,308.77	1,520,270.85	.....
Increase of compensation.....	3,828,656.97	1,764,005.29	2,064,651.68	.....
Miscellaneous items.....	2,542,109.76	2,024,814.40	517,295.36	.....
Special fund; ordnance material, powder, etc.....	³ 23,895.87	47,224.58	.....	71,120.45
Total Military Establishment.....	9,208,524,279.29	5,645,584,931.93	3,614,544,818.28	51,605,470.92
<i>War, miscellaneous, civil.</i>				
National cemeteries.....	3,074,749.07	781,568.78	2,293,180.29	.....
National parks.....	203,910.09	411,517.16	.....	207,607.07
National homes for disabled soldiers.....	3,870,724.52	4,537,882.99	.....	667,158.47
State homes for disabled soldiers.....	590,398.28	928,719.21	.....	338,320.93
Soldiers' Home interest account.....	101,274.66	98,163.75	3,110.91	.....
Monuments.....	23,300.00	28,000.00	.....	4,700.00
Bridge across Potomac River, Georgetown, D. C.....	467,000.00	255,000.00	212,000.00	.....
Judgments of courts.....	1,021,486.51	72,839.39	948,647.12	.....
War claims and relief acts.....	60,782.31	44,027.65	16,754.66	.....
Miscellaneous items.....	346,765.38	494,336.32	.....	147,570.94
Increase of compensation.....	341,032.36	177,780.44	163,251.92	.....
Special funds:				
Wagon roads, etc., Alaska fund.....	32,506.42	256,230.31	.....	223,723.89
Miscellaneous special funds.....	740.97	7,172.56	.....	6,431.59

¹ "Disbursements," as used in these tables, in addition to actual expenditures, include unexpended balances to the credit of disbursing officers.

² Includes payments of Army allotments by the Bureau of War Risk Insurance.

³ Excess of repayments.

Comparison of disbursements,¹ fiscal years 1919 and 1918—Continued.

	1919	1918	Increase, 1919.	Decrease, 1919.
WAR DEPARTMENT—CON.				
<i>War, miscellaneous, civil—Continued.</i>				
Trust funds:				
Pay of the Army, deposit fund	\$755,658.91	\$479,803.14	\$275,855.77	.....
Soldiers' Home permanent fund	566,160.96	597,068.16	.....	\$30,907.20
Miscellaneous trust funds.	308.40	.....	308.40	.....
Total War, miscellaneous, civil.	11,456,798.84	9,170,109.86	3,913,109.07	1,626,420.09
<i>Rivers and harbors.</i>				
Improving rivers.	25,451,141.49	24,209,554.99	1,241,586.50	.....
Improving harbors.	5,765,018.33	4,464,393.81	1,300,624.52	.....
Special funds for rivers and harbors.	1,862,146.50	919,633.09	942,513.41	.....
Total rivers and harbors.	33,078,306.32	29,593,581.89	3,484,724.43	.....
Total War Department.	9,253,059,384.45	5,684,348,623.68	3,621,942,651.78	53,231,891.01
NAVY DEPARTMENT.				
<i>Naval Establishment.</i>				
Increase of the Navy	463,584,580.89	353,532,156.03	110,052,433.86	.....
Bureau of Yards and Docks.	96,239,138.34	58,148,850.00	38,090,288.34	.....
Bureau of Navigation	20,863,626.52	17,224,199.71	3,639,426.81	.....
Bureau of Construction and Repair.	68,374,542.27	55,693,350.54	12,681,191.73	.....
Bureau of Ordnance.	221,043,617.51	189,677,881.54	31,365,735.97	.....
Bureau of Steam Engineering.	59,575,005.92	42,093,835.30	17,535,170.62	.....
Bureau of Supplies and Accounts.	194,594,135.00	70,406,690.01	124,187,444.99	.....
Bureau of Medicine and Surgery.	15,859,690.25	7,784,602.09	8,075,088.16	.....
Marine Corps.	273,018,960.12	246,544,483.34	26,474,476.78	.....
Naval Academy.	4,553,839.87	2,379,052.34	2,174,787.53	.....
Pay of the Navy.	297,601,541.65	130,726,660.36	166,874,881.29	.....
Aviation.	101,655,645.78	27,212,201.42	74,443,444.36	.....
Judgments, Court of Claims.	125,815.57	12,578.31	113,237.26	.....
General account of advances.	363,623,257.42	354,980,660.02	8,642,597.40	.....
Miscellaneous items.	301,528.61	201,291.06	100,237.55	.....
National security and defense.	626,275.44	658,477.15	.....	32,201.71
Increase of compensation.	644,731.53	3,520,658.11	.....	2,875,926.58
Special funds:				
Naval hospital fund.	1,159,746.99	208,127.77	.....	1,367,874.76
Fines and forfeitures.	171,118.58	766,843.10	.....	595,724.52
Clothing fund.	27,836,529.17	6,609,011.04	21,227,518.13	.....
Miscellaneous special funds.	.....	5,450.33	5,450.33	.....
Trust funds:				
Pay, Marine Corps, deposit fund.	83,817.87	196,243.73	.....	112,425.86
Pay of the Navy, deposit fund.	55,317.00	124,267.76	.....	68,950.76
Prize money.	11.21	123.44	.....	112.23
Total Naval Establishment.	2,009,272,388.53	1,368,642,793.84	645,682,811.11	5,053,216.42
INDIAN SERVICE.				
Current and contingent expenses.	1,131,820.36	1,029,350.40	102,469.96	.....
Fulfilling treaty stipulations.	630,110.83	552,580.01	77,530.82	.....
Miscellaneous supports.	758,574.20	707,776.85	50,797.35	.....
Interest on Indian trust-fund accounts.	1,272,809.45	1,579,540.96	.....	306,731.51
Support of Indian schools.	4,105,871.56	4,365,788.40	.....	259,916.84
Miscellaneous expenses.	4,269,161.52	4,066,848.74	202,312.78	.....
Trust funds.	22,424,908.77	18,586,514.67	3,838,394.10	.....
Total Indian Service.	34,593,256.69	30,888,400.03	4,271,505.01	566,648.35

¹ "Disbursements," as used in these tables, in addition to actual expenditures, include unexpended balances to the credit of disbursing officers.

² Includes payments of allotments by the Bureau of War Risk Insurance.

³ Excess of repayments.

Comparison of disbursements,¹ fiscal years 1919 and 1918—Continued.

	1919	1918	Increase, 1919.	Decrease, 1919.
Pensions.....	\$221,614,781.44	\$181,137,754.12	\$40,477,027.32	
Interest on the public debt.....	615,867,337.32	197,526,608.36	418,340,728.96	
	15,365,297,396.38	8,969,911,661.32	6,694,437,171.75	\$299,051,436.60
Deduct repayments received in fiscal year but not covered by warrant.....	3,446,110.82	3,511,456.20		65,345.38
	15,361,851,285.56	8,966,400,205.12	6,694,437,171.75	298,986,091.31
Add repayments covered by warrant in year subsequent to the deposit thereof.....	3,511,456.20	132,060.91	3,379,395.29	
Total ordinary disburse- ments ²	15,365,362,741.76	8,966,532,266.03	6,697,816,567.04	298,986,091.31
Special disbursements:				
Purchase of obligations of foreign governments.....	3,477,850,265.56	4,739,434,750.00		1,261,584,484.44
Purchase of farm loan bonds.....	96,662,398.59	65,153,254.15	31,509,144.44	
Total special disburse- ments.....	3,574,512,664.15	4,804,588,004.15	31,509,144.44	1,261,584,484.44
Panama Canal disbursements	12,265,775.08	20,787,624.92		8,521,849.84
Public debt:				
First Liberty loan, con- verted at 4½ per cent.....	4,003,050.00	656,000.00	3,347,050.00	
Second Liberty loan.....	8,000,000.00	61,050,000.00		53,050,000.00
Second Liberty loan, con- verted at 4½ per cent.....	172,357,600.00		172,357,600.00	
Third Liberty loan.....	201,660,500.00	14,935,500.00	186,725,000.00	
Fourth Liberty loan.....	165,000,000.00		165,000,000.00	
Loan of 1908-1918.....	63,009,460.00		63,009,460.00	
Certificates of indebted- ness, various rates.....	15,046,532,900.00	7,578,271,732.00	7,468,261,168.00	
War Savings certificates.....	134,047,603.63	2,971,967.80	131,075,635.83	
1-year Treasury notes, 3 per cent.....	19,150,000.00	27,362,000.00		8,212,000.00
Bank-note fund.....	23,717,892.50	21,611,225.00	2,106,667.50	
Funded loan of 1907.....	80,550.00	18,200.00	62,350.00	
Miscellaneous redemp- tions.....	6,453.00	2,450.33	4,002.67	
Total public debt disburse- ments.....	15,837,566,009.13	7,706,879,075.13	8,191,948,934.00	61,262,000.00
Total disbursements, exclusive of postal.....	34,789,707,190.12	21,498,786,970.23	14,921,274,645.48	1,630,354,425.59
Postal Service, payable from postal revenues ³	362,504,274.24	324,849,188.16	37,655,086.08	
Total disbursements, including postal.....	35,152,211,464.36	21,823,636,158.39	14,958,929,731.56	1,630,354,425.59

¹ "Disbursements," as used in these tables, in addition to actual expenditure, include unexpended balances to the credit of the disbursing officers.

² Exclusive of Panama Canal, public debt, special disbursements, and Postal Service.

³ Exclusive of grants from the Treasury for deficiencies in postal revenues included in expenses of civil establishment, p. 193.

ESTIMATES FOR THE FISCAL YEARS 1920 AND 1921.

The estimates of receipts and expenditures for the fiscal years ending June 30, 1920, and June 30, 1921, are given in the subjoined tables. The estimates of receipts are based upon existing laws. The estimates of expenditures were made by the respective Government departments and independent establishments.

The following tabulation summarizes the estimated receipts and expenditures for the fiscal year 1920 and, on the basis of the latest information received from the various departments, shows the estimated results at the close of the year:

FISCAL YEAR 1920.

Balance in the Treasury June 30, 1919, free of current obligations....	\$1,002,732,042
Estimated receipts:	
Ordinary.....	\$6,100,250,000
Panama Canal.....	7,200,000
Public debt.....	1,210,556,634
Total.....	\$7,318,006,634
Estimated expenditures:	
Ordinary (exclusive of expenditures from such additional appropriations as may be made for the Railroad Administration).....	6,097,237,892
Special and Panama Canal.....	715,284,837
Public debt (including \$3,633,804,490 certificates of indebtedness outstanding June 30, 1919).....	4,664,104,490
Total (incomplete).....	11,476,627,219
Excess of estimated expenditures (incomplete) over estimated receipts.....	4,158,620,585
Estimated deficit in the general fund June 30, 1920.....	3,155,888,543
Estimated amount necessary for balance in the general fund June 30, 1920.....	750,000,000
Estimated gross deficiency June 30, 1920.....	3,905,888,543

There are many uncertainties in connection with the above figures which must be taken into consideration in attempting to forecast the condition of the Treasury at the close of the current fiscal year, and, of course, this department is not in possession of information that would enable it to form an opinion as to the deficiency estimates which may be presented to the Congress nor as to the additional appropriations the Congress may make.

On July 25, 1919, in a letter to the banks and trust companies of the country, which is quoted in full elsewhere in this report, it was roughly estimated that the expenditures would exceed the receipts for the fiscal year 1920 by not more than \$1,032,000,000, the amount of the deferred installments of the Victory loan. That estimate was made upon the assumption that the amount of certificates of indebtedness outstanding on June 30, 1919, would be taken care of through funding operations or otherwise. The estimate of receipts now presented exceeds that shown in the letter referred to by \$783,006,634.

The difference is largely in the item "Miscellaneous receipts," and for the most part represents salvage of war materials and supplies. Such receipts as these should clearly be applied to the reduction of the floating debt, represented by certificates of indebtedness.

It is important to point out that the estimated expenditures for the Railroad Administration for the fiscal year 1920 are based entirely upon appropriations already made, and do not include any expenditures that may result from such additional appropriations as may be granted for the current year. The Railroad Administration on the date of this report was unable to estimate what additional sums would be expended during the fiscal year 1920, inasmuch as the amounts that will be required are almost entirely dependent upon congressional action in connection with the return of the railroads to private control and the settlement of accounts between the carriers and the Government.

The following is a summary of the estimated receipts and expenditures for the fiscal year 1921 and, on the basis of incomplete information, shows the estimated results at the close of the year:

FISCAL YEAR 1921.

Estimated deficit in general fund June 30, 1920 (as above).....\$3, 155, 888, 543
Estimated receipts:

Ordinary.....	\$5, 412, 000, 000
Panama Canal.....	8, 000, 000
Public debt.....	200, 350, 000

Total.....	\$5, 620, 350, 000
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Estimated expenditures:

Ordinary (exclusive of expenditures by the Railroad Administration, of expenditures from appropriation of \$280, 000, 000 included by the Shipping Board in the Book of Estimates, of expenditures on account of increased compensation of Government employees, of expenditures on account of increased compensation in the Postal Service, of expenditures on account of new construction in the Navy).....	3, 517, 752, 594
Panama Canal.....	18, 245, 391
Public debt.....	437, 800, 000

Total (incomplete).....	3, 973, 797, 985
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Excess of estimated receipts over estimated expenditures (incomplete).	1, 646, 552, 015
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Estimated deficit in the general fund June 30, 1921.....	1, 509, 336, 528
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Estimated amount necessary for balance in the general fund June 30, 1921.....	500, 000, 000
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Estimated gross deficiency June 30, 1921.....	2, 009, 336, 528
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There are even more uncertainties in the estimates for the fiscal year 1921, as stated in the above table, than in the estimates for the current fiscal year. For instance, the estimated receipts include \$500,000,000, representing the capital stock of the United States Grain Corporation, which the Wheat Director hopes to return during the first half of the fiscal year 1921. It is not possible for the director to state positively at this time that the amount will be returned. With respect to estimated expenditures for the fiscal year 1921, it should be pointed out that the Railroad Administration is unable to make an estimate of expenditures during that fiscal year, for the same reason that it is unable to make an estimate of additional expenditures for the current fiscal year. The Chairman of the United States Shipping Board did not include in the estimate of expenditures for the Shipping Board and the Emergency Fleet Corporation any part of the \$280,000,000 for additional ship construction which has been incorporated in the estimate of appropriations for 1921, because, he states, that the matter is dependent upon the action of the President and the Congress in connection with future policy. As it is not known whether the Congress will continue the present increased compensation of Government employees or revise the salaries on the basis of the report of the Joint Congressional Commission on Reclassification of Salaries, no estimate of expenditures in this connection could be included. The above figures likewise do not include any estimate on account of increased compensation in the Postal Service, and the Postmaster General states that if the legislation in this respect enacted this year is repeated next year it will require an additional expenditure of \$40,000,000. The figures submitted by the Secretary of the Navy include no estimate for new construction, as it was necessary for him to study the question further and consequently defer his recommendations until the Congress shall have assembled in regular session.

The above figures show that the estimated expenditures for both of the fiscal years 1920 and 1921 are incomplete. This is particularly true with respect to the latter. Even in their incomplete form, the figures indicate that there will be a deficit in the Treasury at the close of the two-year period ending June 30, 1921, of \$1,509,336,528, if the floating debt is decreased by the amount of certificates of indebtedness outstanding on June 30, 1919. The amount of such debt should be reduced as rapidly as possible, and certainly to the extent of receipts on account of salvage from war materials and supplies, the repayment of stock of Government-owned corporations, and the like.

In connection with the receipts of both fiscal years referred to above, it should be borne in mind that the word "ordinary" in the tables has purely a technical meaning, and that in "ordinary receipts"

are included such exceptional items as repayment of foreign loans, salvage of war materials and supplies by the War and Navy Departments, and repayments of appropriations by the Shipping Board, Wheat Director, etc.

The estimates of receipts and expenditures for the two fiscal years are given in further detail in the following tables:

Fiscal year 1920.

RECEIPTS.	
Ordinary receipts:	
From customs.....	\$275,000,000
From internal revenue—	
Income and profits tax.....	\$3,750,000,000
Miscellaneous.....	1,240,000,000
From sales of public lands.....	4,990,000,000
From miscellaneous sources.....	1,250,000
From miscellaneous sources.....	834,000,000
Total estimated ordinary receipts.....	6,100,250,000
Panama Canal:	
Estimated receipts from tolls, etc.....	7,200,000
Total estimated receipts, exclusive of public debt.....	6,107,450,000
Public debt:	
Third Liberty loan.....	\$1,365,293
Fourth Liberty loan.....	33,568,663
Victory Liberty loan.....	1,030,372,678
War-savings certificates.....	125,000,000
Deposits to retire Federal reserve bank notes and national bank notes.....	20,000,000
Postal-savings bonds.....	250,000
Total estimated public debt receipts.....	1,210,556,634
Grand total estimated receipts.....	7,318,006,634
EXPENDITURES.	
For civil establishment:	
Legislative establishment.....	\$18,518,085
Executive proper, including Tariff Commission and Alien Prop- erty Custodian.....	2,139,017
State Department.....	11,662,595
Treasury Department proper.....	113,120,000
Public buildings, construction, sites, and equipment....	9,000,000
War-risk insurance, \$176,325,140, less premium credits \$136,500,000.....	39,825,140
War Department proper.....	7,350,000
Department of Justice.....	16,800,000
Post Office Department proper.....	1,950,000
Navy Department proper.....	2,125,000
Interior Department proper.....	38,385,277
Department of Agriculture.....	51,647,400
Department of Commerce.....	33,454,034
Department of Labor.....	5,406,322
Shipping Board.....	371,016,521
Wheat guarantee fund.....	350,000,000
European food relief.....	99,000,000

For civil establishment—Continued.

Council of National Defense	\$250, 000
Federal control of transportation systems ¹	750, 770, 855
War Finance Corporation	150, 000, 000
Housing Corporation	4, 600, 000
State, War, and Navy Department buildings	2, 279, 854
Federal Board for Vocational Education	34, 258, 244
Interdepartmental Social Hygiene Board	2, 459, 772
Federal Trade Commission	1, 045, 000
Employees' Compensation Commission	2, 317, 500
Interstate Commerce Commission	4, 593, 267
Other independent offices	1, 149, 540
Expenses of loans	24, 337, 500
Increase of compensation, all departments	30, 760, 000
Additional compensation, Postal Service	35, 698, 400
District of Columbia	18, 456, 569
Total civil establishment	2, 234, 375, 892

For War Department:

Military Establishment	\$1, 650, 000, 000
Rivers and harbors	38, 000, 000
Miscellaneous—War, Civil	16, 657, 000
	1, 704, 657, 000

For Navy Department:

Naval Establishment, exclusive of building program	689, 875, 000
Navy building program	158, 000, 000
	847, 875, 000

For Indian Service..... 38, 000, 000

For pensions..... 220, 030, 000

For interest on the public debt..... 1, 052, 300, 000

Total estimated ordinary expenditures..... 6, 097, 237, 892

Special expenditures:

Purchase of obligations of foreign governments..... 700, 000, 000

Panama Canal:

Expenditures for the canal..... 15, 284, 837

Total estimated expenditures, exclusive of public debt... 6, 812, 522, 729

Public debt:

War saving certificates	\$175, 000, 000
Certificates of indebtedness outstanding	
June 30, 1919	3, 633, 804, 490
Retirement of bank notes	25, 000, 000
Bond purchase fund	740, 000, 000
Bonds purchased from payments on foreign obligations	90, 000, 000
Miscellaneous redemptions of the debt ...	300, 000

Total estimated public debt expenditures..... 4, 664, 104, 490

Grand total estimated expenditures..... 11, 476, 627, 219

¹ The estimated expenditures for Federal control of transportation systems for the fiscal year 1920 are based entirely upon appropriations already made and do not include any expenditures that may result from such additional appropriations as may be granted for 1920. The United States Railroad Administration on the date of this report was unable to estimate what additional sums would be expended during the fiscal year 1920, inasmuch as the amounts that will be required are almost entirely dependent upon congressional action in connection with the return of the railroads to private control.

Estimated excess of expenditures over receipts exclusive of public debt, fiscal year 1920	\$705, 072, 729
Estimated excess of total expenditures over total receipts, fiscal year 1920	4, 158, 620, 585

Postal Service.

The Post Office Department estimates that the postal revenues for the fiscal year 1920 will be \$386,600,000, with expenditures for the Postal Service for the same period of \$387,800,000, exclusive of additional compensation to be paid from the general fund of the Treasury.

Fiscal year 1921.

RECEIPTS.

Ordinary receipts:

From customs		\$325, 000, 000
From internal revenue—		
Income and profits taxes	\$3, 000, 000, 000	
Miscellaneous	1, 190, 000, 000	
		4, 190, 000, 000
From sales of public lands		1, 000, 000
From miscellaneous sources		896, 000, 000
Total estimated ordinary receipts		5, 412, 000, 000

Panama Canal:

Estimated receipts from tolls, etc	\$8, 000, 000
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Total estimated receipts, exclusive of public debt	5, 420, 000, 000
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Public debt:

War-savings certificates	\$175, 000, 000	
Deposits to retire Federal reserve bank notes and national-bank notes	25, 000, 000	
Postal savings bonds	350, 000	
Total estimated public-debt receipts		200, 350, 000
Grand total estimated receipts		5, 620, 350, 000

EXPENDITURES.^{1 2}

For civil establishment:

Legislative establishment	19, 727, 016
Executive proper, including Tariff Commission and Alien Property Custodian	2, 145, 644
State Department	13, 005, 961
Treasury Department proper	130, 880, 000
Public buildings, construction, sites, and equipment	12, 000, 000
War-risk insurance, \$297,649,600, less premium credits, \$100,000,000	197, 649, 600
War Department proper	8, 115, 000
Department of Justice	17, 800, 000
Post Office Department proper	2, 050, 000

¹ Do not include any estimated expenditure on account of increased compensation of Government employees, nor on account of increased compensation in the Postal Service.

² No estimate of expenditures by the United States Railroad Administration for the fiscal year 1921 is included, because on the date of this report the Railroad Administration was unable to make an estimate for that fiscal year, inasmuch as the sums that will be required are almost entirely dependent upon congressional action in connection with the return of the railroads to private control.

For civil establishment—Continued.

Navy Department proper.....	\$3, 000, 000
Interior Department proper.....	53, 856, 092
Department of Agriculture.....	77, 206, 650
Department of Commerce.....	25, 767, 645
Department of Labor.....	9, 564, 624
Shipping Board ¹	34, 590, 100
Council of National Defense.....	320, 000
Housing Corporation.....	1, 203, 028
Federal Board for Vocational Education.....	38, 750, 000
Interdepartmental Social Hygiene Board.....	2, 500, 000
Federal Trade Commission.....	1, 283, 130
Employees Compensation Commission.....	2, 960, 000
Interstate Commerce Commission.....	3, 971, 000
State, War, and Navy buildings.....	2, 264, 505
Other independent offices.....	2, 289, 000
District of Columbia.....	20, 320, 599
Expense of loans.....	12, 456, 000
Total civil establishment ^{2 3}	695, 675, 594

For War Department:

Military Establishment.....	\$921, 000, 000
Rivers and harbors.....	40, 000, 000
Miscellaneous—War, Civil.....	19, 772, 000
	980, 772, 000

For Navy Department:⁴

Naval Establishment, exclusive of building program.....	386, 752, 000
Navy building program.....	185, 248, 000
	572, 000, 000

For Indian Service..... 36, 775, 000

For pensions..... 215, 030, 000

For interest on the public debt..... 1, 017, 500, 000

Total estimated ordinary expenditures (incomplete)..... 3, 517, 752, 594

Panama Canal:

Expenditures for the canal..... 18, 245, 391

Total estimated expenditures, exclusive of public debt.... 3, 535, 997, 985

Public debt:⁵

Sinking fund.....	\$287, 500, 000
War-savings certificates.....	125, 000, 000
Retirement of Federal reserve bank notes and national-bank notes.....	25, 000, 000

¹ The United States Shipping Board states that this estimate does not take into consideration any expenditure from the appropriation of \$280,000,000, which it is estimated will be required for the fiscal year 1921, "if the President and the Congress shall decide that the Shipping Board should go forward and build additional passenger ships and such cargo and tank steamers as may be necessary to make a well-balanced program for a permanent merchant marine."

² Do not include any estimated expenditure on account of increased compensation of Government employees, nor on account of increased compensation in the Postal Service.

³ No estimate of expenditures by the United States Railroad Administration for the fiscal year 1921 is included, because on the date of this report the Railroad Administration was unable to make an estimate for that fiscal year, inasmuch as the sums that will be required are almost entirely dependent upon congressional action in connection with the return of the railroads to private control.

⁴ The Secretary of the Navy states that this estimate does not include any estimated expenditures for new construction.

⁵ Purchases of bonds under authority of sec. 6 of the act of Apr. 4, 1918 (bond purchase fund), are not included as an item of estimated expenditure; this authority expires one year after the termination of the war, and the Secretary reserves decision with respect to such purchases after July 1, 1920.

Public debt—Continued.

Miscellaneous redemptions of the debt.....	\$300, 000
Total estimated public debt expenditures.....	\$437, 800, 000
Grand total estimated expenditures.....	3, 973, 797, 985
Estimated excess of receipts over expenditures, exclusive of public debt, fiscal year 1921.....	1, 884, 002, 015
Estimated excess of total receipts over total expenditures (incomplete), fiscal year 1921.....	1, 646, 552, 015

Postal Service.

The Post Office Department estimates that the postal revenues for the fiscal year 1921 will amount to \$415,500,000, with expenditures for the Postal Service for the same period of \$407,680,000, exclusive of any increased compensation in the Postal Service.

Estimates of appropriations,¹ fiscal year 1921.

The estimates of appropriations for the fiscal year 1921, as submitted by the Government departments and offices, are as follows:

Legislative establishment.....	\$9, 025, 297. 25
Executive establishment:	
Executive proper.....	\$999, 880. 00
Department of State.....	1, 571, 350. 00
Treasury Department.....	73, 405, 101. 36
War Department proper.....	6, 615, 248. 01
State, War, and Navy Department Building, expenses.....	2, 329, 550. 00
Navy Department proper.....	3, 097, 870. 00
Department of Interior.....	6, 287, 185. 00
Post Office Department.....	2, 093, 870. 00
Department of Agriculture.....	37, 528, 102. 00
Department of Commerce.....	12, 778, 337. 40
Department of Labor.....	1, 700, 430. 00
Department of Justice.....	704, 540. 00
	149, 111, 468. 77
Judicial establishment.....	1, 634, 190. 00
Foreign intercourse.....	11, 243, 250. 91
Military Establishment:	
Support of the Army.....	897, 392, 020. 00
Military Academy.....	6, 778, 637. 20
National Guard.....	85, 408, 000. 00
	989, 578, 657. 20
Naval Establishment, including increase of the Navy, \$185, 248, 000.....	542, 031, 804. 80
Indian affairs.....	12, 994, 494. 27
Pensions.....	215, 030, 000. 00
Public works:	
Legislative.....	48, 546. 50
Treasury Department, public buildings and works.....	9, 449, 796. 00

¹ These estimates of appropriations do not include any estimates for the following: The Railroad Administration; increased compensation of Government employees; increased compensation for the postal service; new construction program in the Navy.

Public works—Continued.

War Department—

Military—

Fortifications... \$117,793,330.00

Arsenals..... 7,278,259.00

Military posts.. 14,225,251.67

Rivers and harbors.. 53,659,265.00

Other civil public
works..... 1,622,051.00

\$194,578,156.67

Panama Canal..... 18,245,391.00

Navy Department..... 31,099,450.00

Department of Interior, including recla-
mation fund..... 22,347,070.00

Department of Commerce..... 6,759,900.00

Department of Labor..... 1,198,500.00

Department of Justice..... 195,000.00

\$283,921,810.17

Postal Service, payable from postal revenues..... 391,713,673.00

Miscellaneous:

Legislative..... 10,770,291.20

Executive..... 1,221,344.00

Treasury Department..... 247,396,025.50

War Department..... 8,306,844.04

Department of Interior..... 10,876,831.25

Department of Commerce..... 14,163,801.00

Department of Labor..... 6,075,644.00

Department of Justice..... 15,237,241.35

District of Columbia..... 19,179,716.03

United States Shipping Board..... 447,755,061.59

United States Employees' Compensation
Commission..... 2,953,660.00

Council of National Defense..... 320,000.00

National Advisory Committee for Aero-
nautics..... 437,000.00Smithsonian Institution and National Mu-
seum..... 842,020.00

Interstate Commerce Commission..... 3,971,000.00

Board of Mediation and Conciliation..... 50,000.00

Federal Trade Commission..... 1,283,130.00

Interdepartmental Social Hygiene Board.. 2,500,000.00

Federal Board for Vocational Education... 38,750,000.00

United States Housing Corporation..... 1,203,028.00

Arlington Memorial Bridge Commission... 25,000.00

Rock Creek and Potomac Parkway Com-
mission..... 400,000.00

833,717,637.96

Permanent annual appropriations:

Interest on the public debt..... 1,017,500,000.00

Refunds—

Customs and internal revenue..... 25,207,000.00

Other refunds..... 22,840,600.00

Sinking fund..... 287,500,000.00

Miscellaneous..... 72,360,152.29

1,425,407,752.29

Total estimated appropriations for 1921..... 4,865,410,031.62

Deduct:

Postal Service payable from postal revenues, \$391,713,673; sinking fund \$287,500,000; Panama Canal, \$18,245,391; an aggregate of.....	\$697,459,064.00
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Total estimates for ordinary appropriations for 1921.....	4,167,950,967.62
Add estimates for Panama Canal appropriation.....	18,245,391.00
Add sinking fund requirement.....	287,500,000.00

Total estimated appropriations for 1921, to become a charge upon the general fund.....	4,473,696,358.62
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ESTIMATES FOR 1921 AND APPROPRIATIONS FOR 1920.

Comparison of the estimates for 1921 with the appropriations for 1920 shows a decrease in the 1921 estimates of \$1,155,790,000.80, including the Panama Canal and sinking fund, as exhibited in the table following:

Statement of estimates of appropriations for 1921 compared with appropriations for 1920.

[Excluding postal service payable from the postal revenue, and public debt.]

Departments, etc.	1921 estimates, including perma- nent annual.	1920 appropria- tions, including permanent annual.	Increase, 1921 estimates over 1920 appropria- tions (+); de- crease (-).
Legislative.....	\$19,844,934.95	\$16,524,132.61	+ \$3,320,802.34
Executive:			
Executive proper.....	394,130.00	556,580.00	- 162,450.00
Alien Property Custodian.....	785,094.00	800,000.00	- 11,906.00
Wheat guarantee fund.....		1,000,000,000.00	-1,000,000,000.00
European food relief.....		100,000,000.00	- 100,000,000.00
Tariff Commission.....	400,000.00	300,000.00	+ 100,000.00
Civil Service Commission.....	642,000.00	466,200.00	+ 175,800.00
Department of State:			
Department of State proper.....	1,571,350.00	1,283,460.00	+ 287,890.00
Foreign intercourse.....	11,349,250.91	10,304,135.27	+ 1,045,115.64
Treasury Department:			
Treasury Department exclusive of public buildings.....	133,298,526.86	117,310,319.58	+ 15,988,207.28
Public buildings.....	9,449,796.00	9,378,850.00	+ 70,946.00
War-risk insurance.....	213,999,600.00	113,862,806.00	+ 100,136,794.00
War Department:			
War Department proper.....	6,615,248.01	7,573,550.12	- 958,302.11
Military Establishment— (Estimates for Military Establishment for 1921, \$1,128,950,497.87; appropria- tions for 1920, \$787,889,950.70.)			
Army.....	897,467,020.00	759,222,127.50	+ 138,244,892.00
Military Academy.....	6,778,637.20	2,277,932.20	+ 4,500,705.57
National Guard.....	85,408,000.00	13,177,750.00	+ 72,230,250.00
Fortifications.....	117,793,330.00	11,214,291.00	+ 106,579,039.00
Arsenals.....	7,278,259.00	1,970,000.00	+ 5,308,259.00
Military posts and miscellaneous.....	14,225,251.67	27,850.00	+ 14,197,401.60
Rivers and harbors.....	60,403,865.00	43,192,964.00	+ 17,210,901.00
Miscellaneous war, civil items.....	12,931,895.04	17,925,730.00	- 4,993,834.96
Navy Department:			
Navy Department proper.....	3,097,870.00	2,223,010.00	+ 874,860.00
Naval Establishment— (Estimates for Naval Establishment for 1921, \$577,576,260.80; appropriations for 1920, \$622,374,718.83.)			
Naval Establishment, exclusive of building program.....	392,328,260.80	489,374,718.88	- 97,046,458.08
Navy building program.....	185,248,000.00	133,000,000.00	+ 52,248,000.00
Department of the Interior:			
Department of the Interior, exclusive of Indians and pensions.....	42,571,332.54	34,788,791.68	+ 7,782,540.86
Pensions.....	215,030,000.00	215,030,000.00	—
Indians.....	36,769,494.27	18,327,397.03	+ 18,442,097.24
Post Office Department:			
Post Office Department, exclusive of Postal Service.....	2,093,870.00	1,986,662.97	+ 107,207.03

Statement of estimates of appropriations for 1921 compared with appropriations for 1920—Continued.

Departments, etc.	1921 estimates, including permanent annual.	1920 appropriations, including permanent annual.	Increase, 1921 estimates over 1920 appropriations (+); decrease (—).
Department of Agriculture.....	\$72,568,102.00	\$143,171,270.00	— \$70,603,168.07
Department of Commerce.....	33,705,038.40	30,570,400.03	+ 3,134,638.34
Department of Labor.....	8,974,574.00	4,747,782.46	+ 4,226,791.51
Department of Justice.....	17,946,471.35	16,402,450.34	+ 1,544,021.00
Independent offices:			
Smithsonian Institution and National Museum.....	902,020.00	698,715.00	+ 203,305.00
Interstate Commerce Commission.....	3,971,000.00	4,596,600.00	— 625,600.00
Federal Trade Commission.....	1,283,130.00	1,205,000.00	+ 78,130.00
United States Shipping Board.....	447,755,061.59	356,772,986.00	+ 90,982,075.59
Federal Control of Transportation Systems.....		750,000,000.00	— 750,000,000.00
Housing Corporation.....	1,203,028.00	2,068,970.00	— 865,942.00
Interdepartmental Social Hygiene Board.....	2,500,000.00	1,400,000.00	+ 1,100,000.00
Council of National Defense.....	320,000.00		+ 320,000.00
Federal Board for Vocational Education.....	42,586,000.00	22,182,000.00	+ 20,404,000.00
National Advisory Committee for Aeronautics.....	437,000.00	175,000.00	+ 262,000.00
Board of Mediation and Conciliation.....	50,000.00	44,540.00	+ 5,460.00
Arlington Memorial Bridge Commission.....	25,000.00		+ 25,000.00
Employees Compensation Commission.....	2,953,660.00	1,119,290.00	+ 1,834,370.00
Rock Creek and Potomac Parkway Commission.....	400,000.00	250,000.00	+ 150,000.00
State, War, and Navy Department Buildings.	2,329,550.00	2,408,038.75	— 78,488.75
Indigent in Alaska relief fund.....	25,000.00	25,000.00	
Arlington Memorial Amphitheater Commission.....		77,000.00	— 77,000.00
District of Columbia.....	20,285,316.03	16,396,321.00	+ 3,888,995.03
Interest on the public debt.....	1,017,500,000.00	1,052,300,000.00	— 34,800,000.00
Expenses of loans.....	12,456,000.00	24,337,500.00	— 11,881,500.00
Increase of compensation.....		30,760,000.00	— 30,760,000.00
Additional compensation, Postal Service.....		35,698,400.00	— 35,698,400.00
Ordinary.....	4,167,950,967.62	5,619,506,522.42	—1,451,555,554.80
Panama Canal.....	18,245,391.00	9,979,837.00	+ 8,265,554.00
Ordinary and Panama Canal.....	4,186,196,358.62	5,629,486,359.42	—1,443,290,000.80
Sinking fund.....	287,500,000.00		+ 287,500,000.00
Total ordinary, Panama Canal, and sinking fund.....	4,473,696,358.62	5,629,486,359.42	—1,155,790,000.80

Exhibit of appropriations for 1920.

Appropriations made for the fiscal year 1920 and for prior years during the third session of the Sixty-fifth Congress and the first session of the Sixty-sixth Congress, including revised estimated permanent and indefinite appropriations, and appropriations for the Postal Service payable from postal revenues..... \$6,453,984,749.56

Deduct:

Postal Service for 1920 payable from the postal revenues..... \$401,216,149.00

Postal deficiencies of prior years payable from postal revenues..... 7,150,000.00

Deficiencies and supplementals for prior years..... 416,132,241.14

824,498,390.14

Total appropriations for 1920, exclusive of deficiencies and Postal Service payable from postal revenues..... 5,629,486,359.42

Agreeing with the appropriations for 1920 shown in the preceding table, against which the estimates of appropriations submitted for 1921 show a decrease of \$1,451,555,554.80 in the ordinary and \$1,443,290,000.80, including the Panama Canal.

Attention is respectfully called to further divisions of this report, to wit, the condensed annual reports of the various bureaus and divisions of the Treasury Department, and the tables accompanying the report on the finances.

CARTER GLASS,
Secretary.

To the SPEAKER OF THE HOUSE OF REPRESENTATIVES.

ABSTRACTS OF REPORTS OF BUREAUS AND DIVISIONS.

The following is a summary of the reports of the various bureaus and divisions of the Treasury Department:

TREASURER OF THE UNITED STATES.

During the fiscal year 1919 the ordinary receipts were \$4,647,-603,852.46, an increase of \$473,593,266.72 as compared with those of 1918. The ordinary disbursements were \$15,365,362,741.76, an increase of \$6,398,830,475.43 by like comparison. The net result for the year on ordinary account was a deficit of \$10,717,758,889.30.

The disbursements made on account of the Panama Canal during the fiscal year 1919 were \$12,265,775.08, while the receipts from tolls, etc., were \$6,777,046.55. The net excess of disbursements over receipts was \$5,488,728.53, which was paid out of the general fund of the Treasury.

Extraordinary expenditures of public moneys were made during the fiscal year 1919 under provisions of law as follows: Purchase of obligations of foreign Governments engaged in war with the enemies of the United States, \$3,477,850,265.56; and purchase of Federal farm loan bonds, \$96,662,398.59, making a total of \$3,574,512,664.15.

The transactions affecting the principal of the public debt during the fiscal year 1919 are set forth in the statement following:

Receipts on account of—

Postal savings bonds.....	\$289, 260. 00
National-bank notes.....	22, 644, 757. 50
Certificates of indebtedness.....	16, 955, 327, 890. 00
First Liberty loan.....	8, 485. 38
Second Liberty loan.....	2, 404. 00
Third Liberty loan.....	932, 106, 419. 03
Fourth Liberty loan.....	6, 959, 504, 587. 00
Victory notes.....	3, 467, 844, 971. 77
War-savings and thrift stamps.....	738, 247, 741. 07

Total..... 29, 075, 976, 515. 75

Disbursements on account of—

United States bonds matured.....	\$63,094,640.00
Fractional currency.....	1,823.00
1-year Treasury notes.....	19,150,000.00
Certificates of indebtedness.....	15,046,532,900.00
National-bank notes retired.....	23,717,892.50
United States bonds purchased.....	551,021,150.00
War-savings and thrift stamps purchased..	134,047,603.63

Total disbursements.....\$15,837,566,009.13

Net excess of receipts.....13,238,410,506.62

The balance in the general fund on June 30, 1919 (on a cash receipt and cash payment basis), was \$1,226,164,935.26. The amount of pay warrants drawn during the fiscal year exceeded the receipts by \$1,059,349,775.36, and \$28,066,895.96 additional warrant payments were made by the Treasurer on account of a reduction of this amount in the warrants outstanding at the close of the fiscal year. The book credits of disbursing officers with the Treasurer, however, were \$628,652,026.37 greater at the close of the fiscal year 1919 than at the close of the previous fiscal year, leaving a net reduction for the fiscal year 1919 of \$458,764,644.95 in the balance in the general fund of \$1,684,929,580.21 on June 30, 1918 (on a cash receipt and cash payment basis).

During the fiscal year 1919 the redemptions from the reserve fund were, in United States notes, \$1,506,000. The redeemed notes were under the provisions of the act of March 14, 1900, immediately exchanged for gold, and thereby the reserve was maintained in volume and character.

The gold in the Treasury at the beginning of the fiscal year 1919 amounted to \$2,479,954,967.09. There was a noticeable monthly increase thereafter until May 15, 1919, when the Treasury holdings of the precious metal attained a maximum at \$2,569,059,633.48. The embargo established over the movement of gold on September 7, 1917, was modified by the Federal Reserve Board, with the approval of the President and the Secretary of the Treasury, on June 9, 1919, after which moderate withdrawals reduced the Treasury holdings to \$2,516,441,004.60 by June 30, 1919. Set apart for the respective uses, it was held on the following accounts: Reserve fund, \$152,979,025.63; trust funds (for redemption of gold certificates in actual circulation), \$735,779,491; gold settlement fund of Federal Reserve Board, \$1,416,086,099.10; and in general fund (belonging to the Treasury), \$211,596,388.87.

The imports of gold during the year were \$62,363,733, the exports \$116,575,535, and the net excess of exports \$54,211,802.

The currency distributed from the Treasury in Washington during the fiscal year 1919 to the subtreasuries, banks, and others amounted to \$492,966,596, a decrease of \$351,448,883 as compared with that of the preceding year.

The balance of public moneys on deposit in designated depositaries at the close of the fiscal year 1919 was as follows:

In Federal land banks.....	\$500,000.00
In Federal reserve banks.....	55,300,485.16
In special depositaries.....	905,411,514.76
In national banks.....	52,399,940.18
In foreign depositaries.....	22,885,165.93
In treasury of Philippine Islands.....	9,313,439.48
Total.....	1,045,810,545.51

The general stock of money in the United States at the close of the fiscal year 1919 amounted to \$7,518,789,000, an increase of \$777,716,706 as compared with that of the preceding year. The growth in subsidiary silver coin was \$11,013,858, in Federal reserve notes \$839,976,540, in Federal reserve bank notes \$172,222,980, while gold decreased \$49,197,748, standard silver dollars \$191,370,171, and national-bank notes \$4,928,753. The money in circulation increased in volume by \$386,602,549 and amounted to \$5,766,029,973 on June 30, 1919. The circulation per capita was \$53.59, and the share of gold to whole circulation 28.48 per cent. Money in circulation includes money in banks, but does not include money held at Federal reserve banks and in Treasury against outstanding issues of Federal reserve notes.

During the fiscal year 1919 the notes and certificates of United States paper currency issued numbered 260,333,387 pieces, of the total value of \$350,138,000. The redemptions were 342,789,832 pieces, of the total value of \$789,735,000. The pieces redeemed were 82,456,445 more than those issued and the amount was \$439,597,000 more than the amount issued during the year. The pieces outstanding number 334,550,753, of the total value of \$2,104,197,685. The average cost of each piece of United States paper currency issued and redeemed is about 1.526 cents, and the annual cost of maintenance of the currency issued by the National Government averages slightly less than one-fifth of 1 per cent of the amount outstanding.

National-bank notes amounting to \$358,427,738.05 were presented for redemption during the fiscal year 1919. This sum represented 51.42 per cent of the average amount in circulation. Of the notes received at the Treasury, \$28,599,350 were fit for use and were returned to the banks of issue for further circulation.

Federal reserve notes amounting to \$183,906,757.50 were presented for redemption during the year, of which \$37,297,650 were fit for use and were returned to banks and agents for further circulation.

Federal reserve bank notes amounting to \$60,722,113.50 were presented for redemption, of which \$2,688,700 were fit for use and were returned to banks of issue for further circulation.

The expenses of redemption have been assessed upon the national and Federal reserve banks.

The Treasurer held in trust at the close of the fiscal year 1919 United States bonds to the amount of \$692,252,950 as security for the circulating notes of national banks. The securities pledged for the safekeeping of public deposits in the depository banks amounted to \$53,720,400. The securities held for the safekeeping of deposits in postal-savings depositories amounted to \$206,830,439.48.

The stock of standard silver dollars in the United States at the beginning of the fiscal year 1919 was \$499,515,930. During the fiscal year the Secretary of the Treasury melted or broke up and sold as bullion, under provisions of the act of April 23, 1918, \$191,369,000 of the standard silver dollars held in the Treasury of the United States. Operations under said act during the past two fiscal years resulted in reducing temporarily the general stock of silver dollars in the country by \$260,121,554. On June 30, 1919, the general stock of silver dollars in the country was \$308,145,759, of which \$80,754,524 were in circulation and \$227,391,235 were held in the Treasury, against which Treasury notes of 1890 and silver certificates to the amount of \$170,893,456 were in circulation. Silver dollars were shipped to depositors therefor at the expense of the consignee for transportation as usual during the past year.

The stock of subsidiary silver coin in the country is \$242,870,438, of which \$231,886,499 was in circulation and the balance, \$10,983,939, was held in the Treasury.

The minor coins are not included in the stated stock of money in the country though in circulation in every section of the several States. Such coins are in great demand and are shipped to depositors therefor at the expense of the consignee for transportation, and they are also paid over the counter at Treasury offices in exchange for other kinds of money.

The trust funds, gold and silver, held to redeem notes and certificates in circulation, at the close of the fiscal year 1919, amounted to \$906,672,947, a decrease of \$501,021,304 as compared with like holdings in 1918. The decrease in gold was \$290,852,178 and in silver \$210,169,126.

The balance in the gold settlement fund July 1, 1918, was \$1,205,082,010. The deposits therein during the fiscal year 1919 were \$835,094,319.43, while the withdrawals were \$624,090,230.33, leaving a balance in said fund of \$1,416,086,099.10 on June 30, 1919.

District of Columbia.

The Treasurer of the United States is ex officio commissioner of the sinking fund of the District of Columbia.

There was issued during the fiscal year 1919 \$2,700 in District of Columbia 3.65 per cent bonds, while the funded debt retired amounted to \$4,750, thus reducing the bonded debt of the District of Columbia to \$5,577,700. A net purchase for the sinking fund of \$835,000 in

United States bonds was made during the year, making a total of \$2,492,500 of such bonds held in trust as an offset against the outstanding debt of the District of Columbia.

There has been no change in the old securities of the District of Columbia held in the care and custody of the Treasurer, and they are as follows: Chesapeake & Ohio Canal bonds, \$84,285, and board of audit certificates, \$20,134.72; while in the District of Columbia contractors' guarantee fund there is also a balance of \$132.51 uncalled for.

COMPTROLLER OF THE CURRENCY.

The national banks of the United States for the fiscal year ended June 30, 1919, embracing five and one-half months of war and six and one-half months of the period of readjustment, have recorded the greatest growth and development ever shown in any year since the inauguration of the national banking system in 1863. The increase in their resources for these twelve months amounted to \$2,960,048,000.

On June 30, 1919, the number of national banks in operation stood at the highest point ever reached—7,824, a net increase of 106 over the number in operation June 29, 1918.

For the fiscal year ended June 30, 1919, only two national banks were placed in charge of receivers, and, of these two, one has already arranged to pay depositors 100 cents on the dollar. This record for immunity from failure is the best recorded in nearly 50 years.

On June 30, 1919, the resources of all national banks were \$20,799,550,000. On June 29, 1918, their resources amounted to \$17,839,502,000. On January 13, 1914, the first call succeeding the approval of the Federal Reserve Act, the resources of the national banks amounted to \$11,296,355,138. On February 27, 1874, the resources of the national banks were \$1,808,500,529; so that in the 40 years from 1874 to 1914 the increase was \$9,487,854,609. The increase in resources from January 13, 1914, to June 30, 1919, was \$9,503,194,862. The national banks have, therefore, grown more in resources in the past five and one-half years than in the preceding 40 years.

The total deposits of national banks on June 30, 1919, amount to \$15,924,865,000, being the greatest amount ever reported and representing an increase over June 29, 1918, of \$1,903,256,000. The total United States Government deposits were \$566,793,000; the net amount due to national banks was \$1,134,918,000; the amount of time deposits reported was \$2,784,940,000; demand deposits, \$9,106,192,000; certified checks, cashier's checks, etc., \$481,952,000.

Loans and discounts on June 30, 1919, amounted to \$10,574,838,000, an increase of \$954,436,000 over June 29, 1918. The ratio of loans to deposits June 30, 1919, was 66.4 per cent against 68.6 per cent on June 29, 1918.

The cash on hand June 30, 1919, including balances due from Federal reserve banks and also including items in process of collection, amount to \$1,920,839,000, being an increase during the year of \$224,-689,000.

The United States Government securities held by the national banks at the close of the fiscal year June 30, 1919, including Liberty bonds, Victory notes, United States certificates of indebtedness and old United States bonds, amounted to \$3,171,912,000, an increase over the amount held June 29, 1918, of \$1,055,127,000. Of the \$3,171,912,000 Government securities owned June 30, 1919, \$1,449,518,000 were Liberty bonds and Victory notes, about \$1,032,444,000 were United States bonds and short-term certificates of indebtedness, and approximately \$689,950,000 were old United States bonds held as a basis for circulation. These figures show that on June 30, 1919, only 6.97 per cent of the total resources of the national banks were invested in Liberty bonds and Victory notes, and they held about 4.96 per cent additional United States securities, exclusive of United States bonds held to secure circulation.

Bonds and securities owned, other than United States Government securities, amounted June 30, 1919, to \$1,767,038,000, an increase over the previous year of \$26,193,000.

The net amount due to national banks from all banks (exclusive of Federal reserve banks) was \$1,581,079,000, an increase of \$118,666,000 since June 29, 1918. The aggregate amount due June 30, 1919, to other banks and bankers (except amounts due to Federal reserve banks) by national banks was \$2,974,076,000, an increase of \$177,-515,000 for the year. Against \$1,839,158,000 which the national banks held on deposit to the credit of the state banks, trust companies, and private bankers, the reports show that national banks had on deposit with State banks, bankers, and trust companies \$375,300,000. The national banks therefore had nearly five times as much money on deposit to the credit of State banking institutions as the national banks were themselves carrying with State banks and trust companies.

The official figures show that national banks are almost universally obtaining their loans, when they have occasion to borrow money, from the Federal reserve banks. The total bills payable and rediscounts outstanding June 30, 1919, amounted to \$1,484,769,000, the bills payable due Federal reserve banks were \$991,117,000, and the bills payable other than those of the Federal reserve banks amounted to only \$58,284,000. Rediscounts, including those with the Federal reserve banks and not included in direct liabilities, amounted to \$435,368,000. The bills payable from the Federal reserve banks arose largely from temporary loans which were secured by Liberty bonds, Victory notes, and United States certificates of indebtedness.

The circulation of national banks outstanding on June 30, 1919, was \$677,162,000, a reduction as compared with June 29, 1918, of \$4,469,000.

On June 30, 1919, the national banks had invested in banking houses, furniture and fixtures, etc., 28.94 per cent of their capital, or 1.55 per cent of their resources.

The capital, surplus, and profits of all the national banks on June 30, 1919, amounted to \$2,363,478,000, the highest figures yet reached, and an increase over June 29, 1918, of \$113,685,000.

The total reserve held June 30, 1919, by all national banks (exclusive of two banks in Alaska and three in Hawaii, nonmembers of the Federal reserve system) amounted to \$1,208,969,000, an excess of \$101,866,000 over the amount required by law. The increase in reserve held as compared with June 29, 1918, was \$79,412,000.

The table following shows the number of national banks reporting to the Comptroller of the Currency June 30, 1919, with their aggregate capital by States and by geographical sections.

Number of national banks and amount of capital stock (in thousands of dollars) as shown by reports of condition on June 30, 1919.

State.	Num- ber of banks.	Capital (000s omitted).	State.	Num- ber of banks.	Capital (000s omitted).
Maine.....	62	\$6,915	Michigan.....	108	\$18,905
New Hampshire.....	55	5,235	Wisconsin.....	147	20,805
Vermont.....	48	4,935	Minnesota.....	305	33,501
Massachusetts.....	158	53,942	Iowa.....	356	25,130
Rhode Island.....	17	5,570	Missouri.....	133	41,920
Connecticut.....	67	20,506			
Total Northeastern States..	407	97,103	Total Middle States.....	2,142	312,433
New York.....	480	173,047	North Dakota.....	172	6,465
New Jersey.....	203	22,815	South Dakota.....	126	5,635
Pennsylvania.....	834	119,629	Nebraska.....	189	16,285
Delaware.....	19	1,429	Kansas.....	241	14,040
Maryland.....	96	16,430	Montana.....	134	7,860
District of Columbia.....	14	7,427	Wyoming.....	42	2,312
Total Eastern States.....	1,646	340,777	Colorado.....	127	10,815
Virginia.....	153	22,649	New Mexico.....	44	2,985
West Virginia.....	119	10,389	Oklahoma.....	343	18,940
North Carolina.....	82	9,730			
South Carolina.....	79	9,555	Total Western States.....	1,418	85,337
Georgia.....	95	12,658	Washington.....	83	12,960
Florida.....	53	6,385	Oregon.....	87	10,301
Alabama.....	94	10,745	California.....	279	62,147
Mississippi.....	33	3,800	Idaho.....	70	4,305
Louisiana.....	32	7,955	Utah.....	26	3,455
Texas.....	543	56,912	Nevada.....	10	1,435
Arkansas.....	78	5,467	Arizona.....	18	1,550
Kentucky.....	129	16,106	Alaska (member).....	1	26
Tennessee.....	103	13,674			
Total Southern States.....	1,593	186,025	Total Pacific States.....	574	96,178
Ohio.....	369	64,384	Alaska.....	2	100
Indiana.....	253	28,593	Hawaii.....	3	650
Illinois.....	471	79,195			
			Total nonmembers.....	5	750
			Total of United States.....	7,785	1,118,603

In accordance with the provision of section 333, Revised Statutes United States, which requires the Comptroller of the Currency to incorporate in his annual report to Congress statistics relative to the

condition of banks, other than national, and on account of the uniform courtesy and cooperation extended to his office by the banking departments of the several States, he is enabled to publish each year statistics showing the aggregate resources and liabilities of all reporting banks in the United States, and the table following shows the amount of loans, cash in vault, deposits, and total resources, together with the number of banks reporting on June 30, 1919, in comparison with similar information as of June 29, 1918.

Comparative statement of the number of banks reporting, loans, cash in vault, total deposits, and aggregate resources of all reporting banks in the United States as shown by reports on dates nearest to June 30 for the years 1918 and 1919.

STATE, SAVINGS, AND PRIVATE BANKS, AND LOAN AND TRUST COMPANIES.

[In thousands of dollars.]

(As revised.)

Year.	Number of banks.	Loans. ¹	Cash in vault and due from Federal reserve banks.	All deposits.	Aggregate resources.
1919.....	21,338	\$13,981,458	\$1,169,900	\$21,744,046	\$26,380,529
1918.....	21,175	12,378,760	962,425	18,567,619	22,371,497
Increase.....	163	1,602,698	207,475	3,176,427	4,009,032
Per cent of increase.....	.77	12.95	21.56	17.11	17.92

NATIONAL BANKS.

1919.....	7,785	\$10,574,838	\$1,920,839	\$15,924,865	² \$20,799,550
1918.....	7,705	9,620,402	1,696,150	14,021,609	² 17,839,502
Increase.....	80	954,436	224,689	1,903,256	2,960,048
Per cent of increase.....	1.04	9.92	13.25	13.57	16.59

TOTAL NATIONAL, STATE, SAVINGS, AND PRIVATE BANKS, AND LOAN AND TRUST COMPANIES.

1919.....	29,123	\$24,556,296	\$3,090,739	\$37,668,911	\$47,180,079
1918.....	28,880	21,999,162	2,658,575	32,589,228	40,210,999
Increase.....	243	2,557,134	432,164	5,079,683	6,969,080
Per cent of increase.....	.84	11.62	16.26	15.59	17.33

¹ Overdrafts not included.² Rediscounts not included.

Comparative growth in resources of national and State banking institutions for 5-year period.

Resources national banks, June 30, 1919.....	¹ \$20,799,550,000
Resources national banks, June 30, 1914.....	¹ 11,482,191,000
Increase (81.15 per cent).....	9,317,359,000
Resources State banking institutions, June 30, 1919.....	26,380,529,000
Resources State banking institutions, June 30, 1914.....	15,489,207,000
Increase (70.31 per cent).....	10,891,322,000

Since the inauguration of the national banking system in 1863, there have been issued a total of 11,389 national bank charters.

¹ Rediscounts not included.

Of the 11,389 national bank associations chartered, 552 failed and were placed in charge of receivers; 2,998 have gone into voluntary liquidation; and 15 have been consolidated with other national banks under the act of November 7, 1918. The number of national banks in operation or authorized to do business June 30, 1919, was 7,824.

From the passage of the Federal reserve act, December 23, 1913, to June 30, 1919, the total number of national banks which have been chartered is 920, with an aggregate capital of \$72,529,500. Of these banks, 601 were chartered with a capital of less than \$50,000 each, and aggregate capital of \$15,684,500; and 319 with individual capital of \$50,000 or more, the aggregate capital of such banks being \$56,845,000.

Of the 189 national banks which were chartered during the past fiscal year, 69 succeeded State banks and trust companies, 52 represented conversions, and 17 reorganizations of State and private banks and 120 banks of primary organization.

The capital of the new national banks chartered during the year amounted to \$16,080,000. Of the banks chartered during this period, 120 had individual capital of less than \$50,000 each, the aggregate being \$3,110,000 and the average per bank \$25,917. Sixty-nine banks having aggregate capital of \$12,970,000 were organized, with individual capital of \$50,000 or more, the average capital per bank being \$187,971. One hundred and thirty-nine of the 189 banks organized during the year had not, up to June 30, taken out circulation.

To meet the demands for additional capital during the past year, 224 existing national banks increased their capital in the aggregate \$27,464,100. This compares with increases in the previous year of \$16,150,000, in which 164 banks participated. Only 4 banks reduced their capital during the past year, the aggregate reduction being only \$210,000. In 1918, 6 national banks reduced their capitalization, the total reduction being \$277,800.

During the fiscal year ended June 30, 1919, 66 national banks went into voluntary liquidation, including 3 banks the corporate, existence of which expired by legal limitation. Of the 66 voluntarily liquidating, 10 with an aggregate capital of \$2,680,000 were consolidated with other national banks; 6 with an aggregate capital of \$300,000 went out of business; and 50 with an aggregate capital of \$12,860,000 were absorbed by or reorganized as State banks.

The table following shows the total number of national banks organized up to June 30, 1919, by States and geographical divisions, also the number of national banks which have become insolvent, the number of voluntary liquidations, and the number of banks in operation or authorized to begin business in each State on the date mentioned.

Number of national banks organized, insolvent, in voluntary liquidation, and in operation, as shown by records in the Currency Bureau on June 30, 1919.

States.	Organ- ized.	Insol- vent.	In liqui- dation.	In opera- tion.	States.	Organ- ized.	Insol- vent.	In liqui- dation.	In opera- tion.
Maine.....	111	0	49	62	Wisconsin.....	215	6	62	147
New Hampshire.....	71	4	12	55	Minnesota.....	378	10	62	306
Vermont.....	75	7	20	48	Iowa.....	476	16	104	356
Massachusetts.....	327	15	153	159	Missouri.....	238	12	91	135
Rhode Island.....	65	1	47	17					
Connecticut.....	111	5	39	67	Total Middle States.....	3,161	128	881	2,152
Total New England States.....	760	32	320	408	North Dakota.....	215	14	28	173
New York.....	749	50	216	483	South Dakota.....	169	12	31	126
New Jersey.....	246	10	32	204	Nebraska.....	334	22	122	190
Pennsylvania.....	1,034	44	151	839	Kansas.....	388	37	109	242
Delaware.....	28	0	9	19	Montana.....	171	11	23	137
Maryland.....	125	1	28	96	Wyoming.....	51	2	6	43
District of Columbia.....	26	3	9	14	Colorado.....	180	13	40	127
					New Mexico.....	64	5	15	44
Total Eastern States.....	2,208	108	445	1,655	Oklahoma.....	542	9	188	345
Virginia.....	194	6	34	154	Total Western States.....	2,114	125	562	1,427
West Virginia.....	150	5	26	119	Washington.....	159	24	52	83
North Carolina.....	111	6	23	82	Oregon.....	116	7	22	87
South Carolina.....	96	1	16	79	California.....	349	8	58	283
Georgia.....	151	10	46	95	Idaho.....	86	3	12	71
Florida.....	81	13	14	54	Utah.....	34	1	7	26
Alabama.....	139	9	36	94	Nevada.....	15	2	3	10
Mississippi.....	58	2	23	33	Arizona.....	24	1	5	18
Louisiana.....	71	7	32	32	Alaska.....	3	0	0	
Texas.....	818	34	240	544	Total Pacific States.....	786	46	159	581
Arkansas.....	100	6	15	79	Hawaii.....	6	0	3	3
Kentucky.....	213	6	77	130	Porto Rico.....	1	0	1	0
Tennessee.....	171	8	60	103	Total Island possessions..	7	0	4	3
Total Southern States.....	2,353	113	642	1,598	Total of United States.....	11,389	1,552	23,013	7,824
Ohio.....	603	31	199	373					
Indiana.....	382	15	113	254					
Illinois.....	638	22	143	473					
Michigan.....	231	16	107	108					

¹ Exclusive of 37 banks which were restored to solvency.

² Includes 15 banks consolidated with other national banks under the act of Nov. 7, 1918.

Prior to the approval, on November 7, 1918, of the act providing for the consolidation of national banks, the only method by which two national banks could be amalgamated was by the liquidation of one of the associations and the purchase or acquisition by agreement of its business by the other. The consolidation act provides that any two or more national banking associations located in the same village, town, city, or county may be consolidated into one as ociation under the charter of either of the existing banks on such terms and conditions as may be agreed upon by the majority of the board of directors of each association, when ratified and confirmed by shareholders representing at least two-thirds of the stock, and approved by the Comptroller of the Currency.

Under authority of this act up to and including September 30, 1919, 22 consolidations were effected involving 46 banks with combined capital of \$28,070,000. The capital of these banks after consolidation was \$28,525,000, hence an increase of \$455,000 in the capitalization. In two instances 3 banks were parties to the consoli-

dation, while in each of the other twenty cases but 2 banks were concerned.

The aggregate capital stock of the 2 national banks that have been placed in charge of receivers during the past fiscal year amounted to \$225,000, with aggregate liabilities to depositors and other creditors at the date of suspension of \$2,382,224. One of these two banks, however, has already paid depositors in full, leaving but one bank failure in the fiscal year from which the creditors may suffer loss.

The record shows that of the national banks which have failed since February, 1914, approximately 60 per cent have been either restored to solvency or have paid their depositors 100 cents on the dollar, or are expected to do so, whereas in the nearly fifty-year period prior to 1914 only about 35 per cent of the failed banks were restored to solvency or paid their depositors in full.

For the period of nearly two years from January 1, 1918, to November 1, 1919, covering over ten months of war and nearly twelve months of readjustment, only two small national banks out of nearly 8,000 were placed in charge of receivers, an average of one failure each eleven months. In the 25-year period prior to 1914, national bank failures averaged about eighteen per annum, or one in about every 20 days.

The records show the average number of national bank receiverships per annum per thousand operated banks for the twenty-five years prior to 1914 was more than twenty times, or 2,000 per cent, greater than the average number of such failures per thousand banks for the critical period which has elapsed since January 1, 1918.

This extraordinary reduction in national bank failures and in loss to depositors has resulted from the admirable operations of our new financial and banking system; from the greater thoroughness in the examinations of banks; and from the insistence that national banks shall observe the provisions of the National Bank Act, shall conform to the ethics of sound banking, and shall comply with the regulations promulgated by the Comptroller's bureau for the protection and preservation of the interests of the banks' depositors and shareholders.

MINT SERVICE.

Operations of the Mints and Assay Offices.

During the fiscal year 1919 the demands for coin of denominations below the dollar continued to be very large as compared with the period before the war. The demand for 1-cent pieces was the largest ever known and our presses were run 24 hours a day on this coin for months; 466,839,600 1-cent pieces were issued by the mints during the year. This demand was doubtless due principally to putting into effect certain internal-revenue taxes. The domestic coinage of 434,028,458 pieces has been exceeded only by the coinage of the preceding year; and the coinage for foreign governments amounted to 103,114,195 pieces as compared with 52,748,341 pieces during 1918.

The melting of silver dollars for use as bullion was continued through nearly the entire fiscal year, the operation incident to sale of 200,000,000 fine ounces of silver to the Government of Great Britain for use by the Government of India being completed in May, 1919. Over 191,000,000 dollars were melted during the year, giving total melted under the act of April 23, 1918, of 260, 121, 554 silver dollars.

An event of the year of more than passing importance to the Mint Service was the commencement of work on the new assay office building at New York. The work of the office has been hampered for many years by inadequate and unsuitable quarters, but it is expected that by the close of another fiscal year this will have ended and that the office will be suitably housed, with adequate storage vaults for the large values there kept.

Platinum work—its purchase, refining and manufacture into various shapes for the War Department—continued to be an important feature at the New York assay office during most of the fiscal year.

The technically and practically difficult task of originating and operating assaying and refining processes for platinum and allied metals, begun in the prior fiscal year, was finished this year with results which reflect great credit on the staff of the institution.

The mint service institutions operated during the fiscal year were: Coinage mints at Philadelphia, San Francisco and Denver; assay office at New York, which has a large trade in bars of fine gold and silver; mints at New Orleans and Carson City conducted as assay offices and assay offices at Seattle, Boise, Helena, Salt Lake City, and Deadwood, these being bullion purchasing agencies for the large institutions. Refineries were operated at the New York, Denver, and San Francisco institutions.

The value of the gold acquired by the Government at the mints and assay offices during the fiscal year 1919 was \$126,841,719.19; United States gold coin received for recoinage was of value \$24,521,644.12; transfers of gold between Mint Service offices totaled \$8,978,669.39; making an aggregate of gold handled by the Mint Service during the fiscal year 1919 of \$160,342,032.70.

Silver purchased during the fiscal year 1919 totaled 9,122,029.99 fine ounces, costing \$9,120,806.80, at an average price of \$1.00—per fine ounce; the silver received and repaid to the depositors thereof in bars bearing the Government stamp totaled 439,387.63 fine ounces; the United States silver coin received for recoinage totaled 456,831.78 fine ounces, with recoinage value of \$631,528.29; silver dollars aggregating 116,538,397.85 fine ounces, having a face value of \$151,-569,000, were received from other Treasury offices for melting; Philippine silver coins received for recoinage totaled 617,755 fine ounces; silver deposited in trust by other governments totaled 724,962.41 fine ounces; the transfers of silver between Mint Service offices totaled 3,081,897.57 fine ounces, making an aggregate quantity

of silver handled by the mint service during the fiscal year 1919 of 130,981,262.23 fine ounces. This is about two and two-thirds times the quantity handled last year, the large increase being due to the melting of silver dollars.

The domestic coinage of the fiscal year 1919 was of value \$19,570,657, namely \$14,682,079 subsidiary silver, \$1,457,875 nickel, and \$3,430,703 bronze coin. No gold domestic coin was made.

The coinage other than domestic included 29,195 gold 1-pound blanks for Peru; 13,750,000 nickel pieces and 7,000,000 bronze pieces for Peru; 47,595,000 nickel pieces for Argentina; 100,000 nickel pieces and 750,000 bronze pieces for Nicaragua; and 13,175,000 bronze pieces for Siam, all made at the Philadelphia mint; also Philippine coin made at the San Francisco mint consisting of 11,115,000 silver pieces, 2,000,000 nickel pieces and 7,600,000 bronze pieces.

The seigniorage on United States coinage executed totaled \$8,369,971.01, of which \$4,233,193.43 was on subsidiary silver coins and \$4,136,777.58 was on nickel and bronze coins.

Stock of coin and bullion in the United States.

On June 30, 1919, the estimated stock of domestic coin in the United States was \$1,773,839,984, of which \$1,222,823,787 was gold, \$308,145,759 was silver dollar coin, and \$242,870,438 was subsidiary silver coin.

The stock of gold bullion in the mints and assay offices on the same date was valued at \$1,802,850,973.72, an increase over last year of \$64,291,821.57, and the stock of silver bullion was 17,486,379.70 fine ounces, an increase over last year of 2,590,468.91 fine ounces.

Production of gold and silver.

The production of gold and silver in the United States during the calendar year 1918 was as follows: Gold, \$68,646,700; and silver, 67,810,139 fine ounces.

Industrial arts.

The amount of gold consumed in the industrial arts during the calendar year 1918 was \$52,409,740, of which \$32,892,395 was new material. Silver consumed amounted to 36,252,596 fine ounces, of which 26,722,333 fine ounces were new material.

Export of gold coin.

The net export of United States gold coin for the fiscal year ended June 30, 1919, was \$85,625,872.

Appropriations, expenses, and income.

The appropriated amounts available for Mint Service use during the fiscal year 1919 totaled \$1,778,420.38; reimbursements to appropriations for services rendered amounted to \$522,626.43; making an available total of \$2,301,046.81.

The expenses chargeable to appropriations were \$2,070,052.64; those chargeable to income, \$74,360.51; total, \$2,144,413.15.

The income realized by the Treasury from the Mint Service totaled \$11,849,583.21 of which \$8,371,202.33 was seigniorage; \$2,516,425.05 was received for melting silver dollars and is held to cover the loss by abrasion and the cost of recoinng silver dollars.

Income and expenses are itemized as follows:

INCOME.	
Earnings:	
Credited to appropriations—	
Charges on foreign coinage executed.....	\$326, 726.18
Charges for manufacture of special medals.....	4, 489.33
Charges for work done for other institutions, etc.....	42, 060.17
Charges for melting silver dollars.....	149, 350.75
Total earnings credited to appropriations.....	\$522, 626.43
Credited to revenues—	
Mint charges on bullion.....	299, 204.06
Proceeds of medals and proof coins sold.....	4, 408.93
Receipts from special assays of bullion and ores.....	3, 127.00
Charges on silver-dollar bullion sold.....	2, 516, 425.05
Total earnings credited to revenues.....	2, 823, 165.04
Total earnings.....	\$3, 345, 791.47
Profits:	
Gain on bullion shipments to refineries.....	\$3, 129.33
Less contra losses.....	590.02
Surplus bullion recovered.....	\$2, 539.31
Proceeds of sale of by-products (platinum, etc.).....	123, 694.27
Proceeds of sale of old materials.....	2, 998.24
Excess cash.....	3, 344.11
Commission on telephone calls.....	12.26
Commission on telephone calls.....	1.22
Total profits other than seigniorage.....	132, 589.41
Seigniorage on subsidiary silver coinage.....	4, 233, 193.43
Seigniorage on minor coinage—	
Nickel.....	1, 233, 358.10
Bronze.....	2, 904, 650.80
Total seigniorage.....	8, 371, 202.33
Total profits.....	8, 503, 791.74
Total income.....	11, 849, 583.21

EXPENSES.

Chargeable to appropriations:

Compensation of employees—

Mint Bureau, salaries appropriation.....	\$23, 645. 00
Mint Bureau, increase compensation appropriation.....	1, 317. 00
Mints and assay offices, salaries appropriations.....	240, 882. 37
Mints and assay offices, wages appropriations.....	1, 110, 476. 70
Mints and assay offices, increase compensation appropriation...	106, 169. 71
Total compensation of employees.....	\$1, 482, 490. 78

Equipment, stores, and other expenses—

Mint Bureau, contingent appropriation.....	5, 044. 19
Mints and assay offices, contingent and permanent appropriations (including \$8,406.60 wastage of gold and silver in operative departments, and \$9,535.79 loss on assay value of operative sweeps sold).....	574, 237. 91
Transportation of bullion and coin between mints and assay offices, freight appropriation...	8, 279. 76

Total miscellaneous expenses chargeable to appropriations 587, 561. 86

Total expenses chargeable to appropriations..... \$2, 070, 052. 64

Chargeable to revenue:

Seigniorage on minor coinage—

Expenses of distributing minor coin to Treasury offices.....	69, 002. 35
Wastage of minor metals in operative departments.....	5, 358. 16

Total chargeable to revenue..... 74, 360. 51

Total expenses..... 2, 144, 413. 15

Net income of the Government from the Mint Service..... ¹ 9, 705, 170. 06

Total..... 11, 849, 583. 21

¹ Includes \$2,516,425.05 received for melting silver dollars and held to cover the loss by abrasion and the cost of recoinage.

Deposits, income, expenses, and employees, by institutions, fiscal year 1919.

The number and value of deposits, the income (including seigniorage), the expenses of the fiscal year 1919, and the number of employees on June 30, 1919, at each institution, follow:

Institution.	Number of—		United States coin value of gold and silver received at each institution.	Income.	Expenses from appropriations. ¹	Trans- porta- tion of bullion and coin.	Em- ployees June 30, 1919.
	De- posits.	Rede- posits.					
Philadelphia.....	6,665	683	\$80,413,893.41	\$6,726,256.44	\$990,080.18	\$3,742.32	² 538
San Francisco.....	8,573	227	52,910,376.01	3,277,755.94	358,628.23	34.23	184
Denver.....	3,237	705	20,806,588.36	1,356,491.38	227,753.59	101.11	92
New York.....	14,895	3,515	95,563,211.73	478,023.26	376,974.79	8.53	130
New Orleans.....	342	.....	902,746.42	1,932.46	14,483.95	487.97	10
Carson.....	424	.....	616,102.66	1,565.64	7,346.73	347.33	4
Boise.....	353	.....	437,881.60	1,410.99	8,931.60	290.77	5
Helena.....	397	.....	835,644.19	1,271.20	8,190.55	575.25	5
Deadwood.....	63	.....	421,733.88	764.89	7,515.42	134.62	5
Seattle.....	1,618	12	4,383,371.55	4,139.61	36,066.46	2,546.78	17
Salt Lake City.....	112	.....	14,705.74	561.42	4,074.95	10.85	2
Total.....	36,679	5,142	257,306,255.55	11,850,173.23	2,040,046.45	8,279.76	992

¹ Includes transportation of bullion and coin between mints and assay offices.

² Includes 63 temporary employees.

BUREAU OF INTERNAL REVENUE.¹

The receipts from internal-revenue taxes for the fiscal year 1919 were as follows:

Income and profits tax.....	\$2,600,783,902.70	
Miscellaneous taxes.....	1,249,366,175.86	
		\$3,850,150,078.56
Fiscal year 1918:		
Income and profits tax.....	2,839,027,938.57	
Miscellaneous taxes.....	859,927,882.36	
		3,698,955,820.93
Net increase over 1918.....		151,194,257.63

The following comparative statement shows in greater detail the internal-revenue receipts for the fiscal years 1918 and 1919.

¹ The figures mentioned in this abstract differ from the figures carried in the financial statements of internal-revenue receipts because they represent collections by internal-revenue officers throughout the country, whereas the latter represent the deposit of these collections in the Treasury or depositaries during the fiscal year concerned, the difference being due to the fact that some of the collections in the latter part of the fiscal year can not be deposited, or are not reported to the Treasury as deposited, until after June 30, thus carrying them into the following fiscal year as recorded in the financial statements.

Sources.	1918	1919	Increase (+) or decrease (-).
Income and profits.....	\$2,839,027,938.57	\$2,600,783,902.70	—\$238,244,035.87
Estates of decedents.....	47,452,879.78	82,029,983.13	+ 34,577,103.35
Distilled spirits, and alcoholic beverages.....	443,839,544.98	483,050,854.47	+ 39,211,309.49
Tobacco and tobacco manufactures.....	155,188,659.90	206,003,091.84	+ 49,814,431.94
Oleomargarine, adulterated, and process or renovated butter, and mixed flour.....	2,403,036.05	2,926,414.21	+ 523,378.16
Bonds, capital stock issues, conveyances, capital stock transfers, and sales of produce for future delivery.....	17,538,552.26	33,551,873.53	+ 16,013,321.27
Transportation of freight, express, passengers, etc.	70,736,550.01	237,839,572.30	+ 167,103,022.29
Insurance.....	6,492,025.48	14,508,881.31	+ 8,016,855.83
Excise taxes (sales by manufacturers, producers, and importers) including automobiles, motorcycles etc.....	39,068,687.10	82,424,873.83	+ 43,356,186.73
Excise taxes (sales by dealers) including sculpture and paintings: carpets, picture frames and wearing apparel; perfumes and cosmetics; soft drinks, ice cream, etc.....	993,477.72	6,147,269.45	+ 5,153,791.73
Corporations on capital stock.....	24,996,204.54	28,775,749.66	+ 3,779,545.12
Brokers, theaters, museums, bowling alleys, billiard and pool tables, shooting galleries, riding academies, passenger automobiles for hire, etc.....	2,691,586.87	4,721,298.16	+ 2,029,711.29
Admissions to places of amusement and entertainment, and club dues.....	28,616,395.37	54,992,157.01	+ 26,375,761.64
Narcotics: Importers, manufacturers, compounders, dealers, etc.....	185,358.93	693,686.30	+ 508,327.37
Sales of condemned Government property, receipts under repealed laws, other miscellaneous collections, etc.....	14,388,741.16	1,501,004.15	— 12,887,737.01
Sales of internal-revenue stamps affixed to parcel-post packages, etc., reported by the Postmaster General.....	4,336,182.21	10,199,466.51	+ 5,863,284.30
Total miscellaneous taxes.....	859,927,882.36	1,249,366,175.86	+ 389,438,293.50
Total receipts from all sources.....	3,698,955,820.93	3,850,150,078.56	+ 151,194,257.63

¹ Includes \$13,296,927.32 from "Munition manufacturers' tax," which was repealed by the Revenue Act of 1917, effective Jan. 1, 1918.

Revenue Act of 1918.

The Revenue Act of 1918, approved February 24, 1919, provided for the raising of approximately \$10,000,000,000 during the first 24 months of operation through substantial increases in the rates provided by previous legislation and through the addition of a number of new objects of taxation. In the brief period remaining after the passage of the act before the close of the fiscal year, regulations and instructions for carrying out the provisions of the new legislation were prepared and issued and an extraordinary effort was made to secure the filing of returns of floor taxes which were assessable immediately after the passage of the act, and to care for the prompt handling of more than 4,000,000 returns of income and profits, together with the first quarterly installment of the tax due in connection with these returns on March 15.

Cost of administration.

The cost of administering the internal-revenue laws for the fiscal year 1919 aggregated \$20,573,771.52, or 0.534 per cent of the total collections, compared with \$12,003,214.07 for the fiscal year 1918, representing 0.325 per cent of the collections during that year.

During the fiscal year very large expenditures were made in connection with the assessment of income and profits taxes under the Revenue Act of 1918, although the collections from these assessments are payable, under the installment plan, partly in the fiscal year 1919 and partly in the fiscal year 1920. The increase in the ratio is due in part, also, to the expansion of the organization for the purpose of investigating and auditing the accumulation of income and profits tax cases for prior years as well as for the current year, and to expenditures for the administration of the child-labor tax law and other revenue measures under which collections are disproportionately low. The cost of collecting internal revenue under purely revenue laws can no longer be accurately measured by the cost of administration.

Income and profits taxes.

The collections of income and profits taxes during the year amounted to \$2,600,783,902.70, or \$238,244,035.87 less than the collections during the preceding fiscal year from similar sources. The decrease resulted from the provision in the Revenue Act approved February 24, 1919, for the payment of income and profits taxes in four quarterly installments, only two of which fell within the fiscal year. Under assessments made during the fiscal year the total amount of collections of taxes based on income arising in the calendar year 1918 will be augmented by approximately \$2,000,000,000, which will be included in the receipts of the fiscal year 1920. The number of income and profits tax returns filed under the Revenue Act of 1918 was more than 4,000,000, compared with less than 3,500,000 the year before. The problem of verifying and auditing this vast number of returns and preparing to handle expeditiously a similar task which will recur each year is being solved by the gradual recruitment and training of a large staff of competent auditors at Washington and by gradually assigning to the collectors of internal revenue throughout the country the handling of the various classes of cases arising in their districts as rapidly as the organization under each collector can be perfected and expanded. During the past year all returns of individuals having incomes of less than \$5,000 were retained by the collectors for a preliminary audit, which resulted in the early correction of many errors and left the organization at Washington free to devote attention exclusively to the larger and more difficult cases.

The Revenue Act of 1918 included a number of provisions for the adjustment of inequalities and inequities which had been found to arise under the operation of the Revenue Act of 1917. The interpretation and administration of these provisions necessarily complicated the handling of cases to which these provisions were found to apply.

In the expectation that a large number of claims would be filed under these relief provisions, Congress provided for the creation of the Advisory Tax Board, which was established on March 13, 1919, and discontinued October 1, 1919, after having rendered invaluable service in the framing of regulations, the hearing of appeals, and the disposition of difficult cases arising under the income and profits tax laws. In place of the Advisory Tax Board a unit of bureau experts, with appellate functions, has been created to continue the work of the board in hearing appeals presented by taxpayers.

Estate tax.

The Revenue Act of 1918 made extensive changes in the former acts providing for a tax on the net estate of decedents. The rate of tax on estates less than \$1,500,000 has been reduced, exemption has been provided for the estates of persons dying while actually serving in the military or naval forces, deductions are allowed of all bequests or gifts to the United States or any State, Territory, or political subdivision, or to eleemosynary and certain other institutions. The amount of tax collected during the year, however, aggregated \$82,029,983.13, compared with \$47,452,879.78 the preceding year.

Capital-stock tax.

The rate of tax on the capital stock of corporations was increased by the Revenue Act of 1918 from 50 cents to \$1 for each \$1,000 of the full value of the capital stock, and the amount exempt from tax was reduced from \$99,000 to \$5,000. As a result of these and other changes in the law, the number of taxable corporations was increased from 65,000 to 350,000. The full effect of the change in the annual rate of collections is not reflected in the collections which were made before the close of the fiscal year, amounting to \$28,775,749.66, compared with \$24,996,204.54 the year before.

Child-labor tax law.

The child-labor tax law, which became effective on April 25, 1919, under legislation included in the Revenue Act of 1918, received special attention during the brief period remaining before the close of the fiscal year. Information regarding the requirements of the law was widely disseminated and appropriate instructions issued to all field officers of the Internal Revenue Service. A special division was organized in the bureau at Washington, which has established the procedure by which employers may present satisfactory evidence of the ages of minor employees. No tax has as yet been found to be collectible under this law and employers generally have manifested a

gratifying disposition to cooperate with the revenue officers in securing the observance of the standards of taxability prescribed by the law.

Taxes on sales, special and miscellaneous commodities, occupations, and admissions and dues.

As the result of the improvement of administrative procedure under the provisions of the Revenue Act of 1917 providing taxes on sales of certain commodities by manufacturers and dealers and on transportation, insurance, admissions and dues, and certain occupations, as well as changes in the Revenue Act of 1918 affecting these objects of taxation, it has been found necessary to create a special administrative unit to give attention to the assessment and collection of taxes under these various classifications. During the year the collections from the transportation tax aggregated \$237,839,572.30, compared with \$70,736,550.01 in the preceding fiscal year. The excise taxes on the sales by manufacturers, producers, and importers of automobiles, motor cycles, and certain other commodities yielded \$82,424,873.83, compared with \$39,068,687.10 in 1918. The excise taxes on sales by dealers of certain works of art, carpets, picture frames, wearing apparel, perfumes and cosmetics, soft drinks, ice cream, and other commodities amounted to \$6,147,269.45, compared with \$993,477.72 in 1918. The collection of taxes on various occupations and on admissions and dues amounted to \$4,721,298.16 and \$54,992,157.01, respectively, compared with \$2,691,586.87 and \$28,616,395.37, respectively, in 1918.

Distilled spirits.

During the fiscal year ended June 30, 1919, there were produced from materials other than fruit 98,976,118.3 taxable gallons of distilled spirits, a decrease of 74,500,355.4 gallons compared with the quantity of like spirits produced during the preceding fiscal year.

Of this class of spirits there were removed from bonded warehouses, on payment of tax, 81,598,086.5 taxable gallons, a decrease of 6,189,737.0 taxable gallons from the quantity tax paid during the preceding fiscal year. This decrease in the quantity of spirits tax paid resulted from the extension of prohibition to several States during the year, and from the increase in the rate of tax to \$6.40 a proof gallon on spirits intended for beverage purposes.

The quantity of spirits remaining in distillery and general bonded warehouses at the close of the fiscal year 1919 was 72,358,151.1 gallons, a decrease of 86,601,113.4 gallons from the quantity—158,959,264.5 gallons—so held in bond at the close of the preceding fiscal year.

A large decrease in production of spirits and in the use of denatured alcohol during the year resulted from the greatly reduced demand at the close of the war for alcohol to be used in the manufacture of munitions for the United States Government as well as for the allies. Nor were any spirits produced during the year for beverage purposes, such production being prohibited by the act of August 10, 1917. Nevertheless, the protection and disposition of this vast quantity of liquors involves serious administrative problems. These spirits may be withdrawn for export or for use for nonbeverage purposes, but the demand in these directions is relatively small, and it appears probable that on January 16, 1920, when permanent prohibition becomes effective, at least 50,000,000 gallons will still remain in the bonded warehouses.

Denatured alcohol.

During the fiscal year 1919 there were withdrawn from bond free of tax, for denaturation, 60,399,308.9 proof gallons of alcohol and rum, against 90,644,722.8 proof gallons withdrawn for this purpose during the previous year.

Industrial distilleries.

During the fiscal year 1919, 208 industrial distilleries were established under the act of October 3, 1913. This act by authorizing greater freedom in registration and conduct of distilling operations sought to encourage the production of alcohol from the waste products of farms. Under the act of October 3, 1917, fermented malt liquors were authorized to be used as distilling material at industrial distilleries contiguous to brewery premises in the production of alcohol for denaturation. Many of the industrial distilleries formerly operated as breweries qualified during the past year and were converted into industrial distilleries in order to permit, in the course of manufacture of cereal beverages, the fermenting of material containing one-half of 1 per cent or more of alcohol—the finished product, however, to contain less than one-half of 1 per cent alcohol by volume.

Distilleries.

In addition to industrial distilleries operating under the act of October 3, 1913, there were engaged in the production of distilled spirits, at the close of the fiscal year, 13 grain distilleries, 23 molasses distilleries, and 38 fruit distilleries—a total of 74, compared with 236 in 1918. Supervision over all establishments engaged in the manufacture, rectification, and sale of distilled spirits is maintained through the field officers of the Internal Revenue Service. For the sale or use of distilled spirits for other than beverage purposes 31,880 permits were issued.

Fermented liquors.

The number of operating breweries decreased during the fiscal year 1919, the number of going concerns at the close of the year being 669, or 423 less than in 1918. The output of breweries during the past year aggregated 27,712,648 barrels, a decrease of 22,553,568 barrels from the production in 1918.

Wines and cordials.

Revenue from taxes on wines and cordials during the fiscal year ended June 30, 1919, amounted to \$10,521,609.14, compared with \$9,124,368.56 in 1918 and \$5,164,075.03 in 1917. The total production was 55,756,171 gallons for the fiscal year, of which 48,153,437 gallons had not over 14 per cent alcoholic content and 7,602,734 gallons had over 14 per cent but not over 24 per cent alcoholic content. On June 30, 1919, there were 17,521,147 gallons of wine on hand, compared with 47,159,384 gallons on hand June 30, 1918.

Prohibition enforcement

The prohibition-enforcement act places in the Bureau of Internal Revenue and the Department of Justice the important responsibility for the enforcement of prohibition. This work is essentially unrelated to the collection of taxes, which is the function of the bureau, and both the Secretary of the Treasury and the Commissioner urged that this important responsibility should not be imposed on the Treasury Department, which is already burdened with the fiscal and revenue problems of the Government. However, the Congress, evidently considering the similarity of some phases of the work of internal-revenue agents in the field, who are assigned to secure evidence and aid in the prosecution of persons who have evaded the taxes imposed by law on the manufacture and sale of alcohol beverages, with the police function of prohibition enforcement officers, has directed the Bureau of Internal Revenue to undertake, in addition to its functions as a tax-gathering agency, the enforcement of the prohibition law. Accordingly a separate and distinct organization within the Bureau of Internal Revenue will be created for this purpose.

Not to enforce prohibition thoroughly and effectively would reflect upon the Government and would bring into disrepute the reputation of the American people as law-abiding citizens. No law can be effectively enforced except with the assistance and cooperation of the law-abiding element. The bureau will accordingly put into operation at once the necessary organization to cooperate with the States

and the public in the rigid enforcement of the prohibition law, and appeals to every law-abiding citizen for support.

The bureau expects unreserved cooperation from those moral agencies which are so vitally interested in the proper administration of this law. Such agencies include churches, civic organizations, educational societies, charitable and philanthropic societies, and other welfare bodies. The bureau expects also cooperation and support from all citizens of the United States who may have opposed the adoption of the constitutional amendment and the law which make unlawful certain acts and privileges which were formerly not unlawful. Regardless of personal conviction, it is the right of the Government officers charged with the enforcement of this law to expect the assistance and moral support of every citizen in upholding the law.

The Bureau of Internal Revenue undertakes the task intrusted to it with a sense of assurance prompted by the same abiding faith in the American people that enabled it to appeal successfully to them for cooperation in the enforcement of the war-revenue laws. The people have so loyally responded to their heavy tax obligations that there is no reason to doubt that they will respond with equal loyalty to the efforts which the bureau will make in good faith to enlist the cooperation of citizens in the enforcement of the measure which, like the income tax, is now a part of the Constitution of the United States. The adequate and impartial enforcement of prohibition will sustain the majesty of the law and the honor of American citizens and American institutions.

BUREAU OF WAR RISK INSURANCE.

The following tables indicate the operation of the Bureau of War Risk Insurance during the fiscal year ended June 30, 1919, and show that a vast number of claims have been received and disposed of in that period. It is interesting to note that in the Marine and Seamen's Division the operations have resulted in a profit over losses incurred of about \$17,000,000, while in the Military and Naval Division the cost to the Government of insurance of soldiers and sailors in the active service over the premiums paid by the men was in excess of \$700,000,000.

Marine and seamen's insurance.

The writing of marine and seamen's insurance was suspended on January 4, 1919. Between July 1, 1918, and January 4, 1919, approximately one-third of the total insurance on hulls, cargoes, and freight was written, and during the same period five-sixths of the total insurance on the lives of seamen was written.

Since January 4, 1919, the bureau's activities in marine and seamen's insurance have been directed toward the settlement of all outstanding claims.

TABLE I.—*Statement of policies written for insurance on hulls, cargoes, and freight for the fiscal year ended June 30, 1919.*

Total number of policies issued.....	10, 034
Gross amount written.....	\$838, 724, 776
Cancellations.....	16, 283, 898
Net amount written.....	\$822, 440, 878
Net amount at risk July 1, 1918.....	\$115, 664, 225

TABLE II.—*Statement of premiums for insurance on hulls, cargoes, and freight for the fiscal year ended June 30, 1919.*

Gross premiums received.....	\$4, 043, 954. 63
Premiums refunded.....	483, 315. 87
Net premiums received.....	3, 560, 638. 76
Salvage received.....	957. 33
Total net income for the year.....	3, 561, 596. 09

The following table shows the amount of claims paid during the fiscal year and the estimated surplus premiums at the end of the year:

TABLE III.—*Statement of claims due to insurance on hulls, cargoes, and freight for the fiscal year ended June 30, 1919.*

Claims outstanding June 30, 1918.....	\$7, 639, 846. 00
Claims paid during fiscal year ended June 30, 1918.....	6, 712, 917. 24
Claims outstanding June 30, 1919 (including estimated unrepresented claims in sum of \$661, 711).....	1, 443, 751. 00
Surplus premiums and salvage on hand July 1, 1918 (difference between total receipts to that date and total expenses and losses, paid and estimated).....	13, 684, 114. 03
Estimated surplus premiums and salvage on hand July 1, 1919.....	16, 678, 854. 32

A total of \$822,440,878 of insurance on hulls, cargoes, and freight was written during the fiscal year. This was distributed as shown in the following table:

TABLE IV.—*Statement of total number of and amount of policies written for insurance on hulls, cargoes, and freight for the fiscal year ended June 30, 1919.*

1, 846 Hulls insured for	\$483, 659, 106
7, 946 Cargoes insured for.....	328, 823, 970
242 Freight.....	9, 957, 802
10, 034 Total policies insured for.....	822, 440, 878

An analysis of the losses incurred during the fiscal year is shown in the following table.

TABLE V.—*Losses occurring during the period from July 1, 1918, to June 30, 1919.*

Vessel.	Date of loss.	Amount of insurance.			Settled claims.		Salvage and deductions.	Outstanding claims.	
		Hull.	Cargo	Total	Number.	Amount.		Number.	Amount.
	1918.								
Robert & Richard.....	July 22	\$12,000	.....	\$12,000	1	\$11,950.00	\$50.00	.....	.....
Muriel.....	Aug. 3	12,000	.....	12,000	1	11,950.00	50.00	.....	.....
Cruiser Stanley.....	do. 3	3,000	.....	3,000	.....	.....	.....	1	\$3,000
M. Seaman.....	Aug. 5	120,000	.....	120,000	1	120,000.00	.....	.....	.....
Progress.....	Aug. 10	6,000	.....	6,000	1	5,993.00	7.00	.....	.....
William H. Starbuck.....	do. 5	3,200	.....	3,200	1	3,200.00	.....	.....	.....
Dorothy B. Barrett.....	Aug. 14	75,000	.....	75,000	1	74,903.57	96.43	.....	.....
Madrugada.....	Aug. 15	\$75,000	.....	75,000	.....	.....	.....	1	75,000
C. A. Canfield.....	Aug. 17	1,218,750	.....	1,218,750	.....	250.00	.....	1	50,000
A. Piatt Andrew.....	Aug. 20	\$3,600	.....	3,600	25	3,600.00	.....	.....	.....
Rush.....	Aug. 26	31,000	.....	31,000	1	30,938.00	62.00	.....	.....
Kingfisher.....	Sept. 20	50,000	.....	50,000	1	49,800.00	200.00	.....	.....
Total.....		1,530,950	78,600	1,609,550	33*	312,584.57	465.43	3	128,000

* Surveyor's fees.

* Personal effects and crew's outfits.

Transactions of the fiscal year in connection with the insurance of seamen against death, disability, or detention are shown in Tables VI and VII.

TABLE VI.—*Statement of policies written and premiums received for the insurance of seamen against death, disability, or detention for the fiscal year ended June 30, 1919.*

Total number of policies issued.....	4,972
Seamen insured.....	116,561
Gross amount written.....	\$211,081,616.76
Cancellations.....	16,772,699.76
Net amount written.....	194,308,917.00
Net amount at risk July 1, 1918.....	6,407,053.60
Net amount at risk June 30, 1919 (since expired).....	95,200.00
Gross premiums received.....	122,194.82
Premiums refunded.....	57,657.50
Net premiums received.....	64,537.32

TABLE VII.—*Statement of claims for insurance of seamen against death, disability, or detention for the fiscal year ended June 30, 1919.*

110 Total determined losses June 30, 1918.....	\$193,163.00
73 Claims presented during year.....	121,911.47
38 Claims disallowed (not war risk causes).....	64,575.00
7 Claims disallowed (war risk causes, but not within limits of policy) ..	10,890.00
4 Claims awaiting proof.....	7,110.00
180 Total determined losses June 30, 1919 (including unrepresented)....	302,967.81
53 Claims adjusted during year.....	94,084.81
Paid on adjusted claims.....	\$89,922.03
Amount due on adjusted claims June 30, 1919.....	41,323.03
Surplus premiums on hand July 1, 1918 (difference between total receipts to that date and total expenses and losses).....	564,676.16
Estimated surplus premiums on hand July 1, 1919.....	484,771.88

Military and naval allotments and family allowances.

During the fiscal year the peak of the payments for military and naval allotments and family allowances was reached.

Approximately 645,000 awards were active at the end of the fiscal year, June 30, 1919. In December, 1918, the active cases numbered more than 1,544,000. The transactions in detail are shown in the following tables.

TABLE I.—*Allotments and family allowances, applications, exemption claims, and award for the fiscal year ended June 30, 1919.*

Applications received from men having dependent relatives.....	1, 858, 613
Number of awards made to men having dependent relatives.....	1, 074, 890
Number of claims filed for exemption from allotment.....	74, 609
Number of cases granted full exemption.....	52, 168
Number of cases granted partial exemption.....	6, 404
Number of cases denied exemption.....	11, 021
Number of cases not acted upon.....	5, 016

TABLE II.—*Allotments and family allowances, disbursements by months, distributed by branches of the service, for the fiscal year ended June 30, 1919.*

Month.	Allotment.	Allowance.	Month.	Allotment.	Allowance.
ARMY.			NAVY.		
July, 1918.....	\$11,991,014.59	\$7,921,147.44	July, 1918.....	\$1,805,813.29	\$1,511,087.32
August, 1918.....	13,363,400.19	12,248,590.51	August, 1918.....	1,742,446.36	1,589,116.71
September, 1918.....	14,620,126.46	13,868,663.90	September, 1918.....	2,523,512.35	2,194,430.83
October, 1918.....	12,377,350.46	12,048,365.21	October, 1918.....	2,584,394.53	2,385,160.04
November, 1918.....	25,867,178.19	25,716,047.76	November, 1918.....	2,967,193.66	2,624,390.56
December, 1918.....	11,490,028.63	10,948,647.48	December, 1918.....	2,190,766.40	2,002,633.11
January, 1919.....	25,373,245.40	23,800,537.29	January, 1919.....	2,975,045.05	2,495,387.48
February, 1919.....	14,702,362.88	13,940,041.21	February, 1919.....	2,285,665.62	1,965,336.18
March, 1919.....	13,607,990.28	13,732,528.74	March, 1919.....	1,874,257.71	1,573,767.87
April, 1919.....	12,738,839.29	11,303,966.98	April 1919.....	1,632,724.83	1,605,360.95
May, 1919.....	9,881,002.31	10,910,272.30	May, 1919.....	1,263,391.92	1,404,146.71
June, 1919.....	7,940,057.57	9,243,811.03	June, 1919.....	1,289,905.47	1,247,003.66
Total.....	173,952,596.25	165,682,619.85	Total.....	25,135,117.19	22,597,821.42
MARINE CORPS.			COAST GUARD.		
July, 1918.....	123,928.94	106,132.07	July, 1918.....	69,571.75	62,848.03
August, 1918.....	125,263.16	123,395.39	August, 1918.....	51,233.45	65,374.25
September, 1918.....	198,532.21	196,611.30	September, 1918.....	48,661.66	64,026.24
October, 1918.....	206,778.14	209,394.75	October, 1918.....	50,132.37	64,955.89
November, 1918.....	191,303.45	192,098.12	November, 1918.....	47,365.50	62,863.62
December, 1918.....	193,901.84	196,286.73	December, 1918.....	53,142.94	67,412.97
January, 1919.....	204,444.07	204,467.79	January, 1919.....	43,416.85	63,786.75
February, 1919.....	186,041.18	202,827.55	February, 1919.....	44,599.42	61,753.21
March, 1919.....	213,726.37	192,357.36	March, 1919.....	43,002.05	58,274.51
April, 1919.....	169,600.16	169,682.99	April, 1919.....	42,216.18	60,281.87
May, 1919.....	138,764.46	158,641.89	May, 1919.....	38,350.54	56,793.96
June, 1919.....	138,542.17	152,492.72	June, 1919.....	38,350.03	56,730.77
Total.....	2,090,826.15	2,103,788.66	Total.....	575,042.74	744,682.07

SUMMARY.

Branch of the service.	Allotment.	Allowance.	Total.
Army.....	\$173,952,596.25	\$165,682,619.85	\$339,635,216.10
Navy.....	25,135,117.19	22,597,821.42	47,732,938.61
Marine Corps.....	2,090,826.15	2,103,788.66	4,194,614.81
Coast Guard.....	575,042.74	744,682.07	1,319,724.81
	201,753,582.33	191,128,912.00	392,882,494.33

MILITARY AND NAVAL COMPENSATION.

Compensation is payable for death or for disability incurred while in the military or naval service, in addition to war risk insurance. Every notice of death or disability received from the War or Navy Department is therefore considered as a claim, and an investigation is made to determine whether or not compensation is payable. When the men are detached from the service they undergo a thorough medical examination. The bureau is furnished with copies of these medical examinations whenever they are needed in connection with claims.

The following table shows the number of claims on hand at the beginning of the year, those received during the year, and the disposition of both.

TABLE I.—*Statement of number of claims for military and naval compensation due to death or disability of men in the service for the fiscal year ended June 30, 1919.*

Claims pending at the end of previous fiscal year.....	10, 255	
Claims received during the fiscal year (death and disability).....	223, 167	
Total.....		233, 422
Claims allowed for compensation for death.....	23, 805	
Claims allowed for compensation for disability.....	31, 785	
Total claims allowed.....		55, 590
Claims withdrawn—death.....	12, 760	
Claims withdrawn—disability.....	2, 668	
Total claims withdrawn.....		15, 428
Claims disallowed—death.....	41, 099	
Claims disallowed—disability.....	2, 055	
Total claims disallowed.....		43, 154
Total claims disposed of.....		114, 172
Pending at end of year.....		119, 250

Many of the claims listed above as "pending" are not claims in the true sense. The notifications of death and disability are forwarded by the Army and Navy and are all treated as claims. In many cases it is found that there are no relatives entitled to receive the benefits of military and naval compensation. All such cases are thoroughly investigated and are considered as pending claims during this period of investigation. Claims in which the degree of the disability or the dependency is questionable may be allowed to remain pending, since, under the act, it is permissible to complete at a later date the proof of disability or of dependency. In many instances the degree of the disability may become such that there is no question that the case is compensable. In death cases compensation is payable, provided the dependency of the father or mother, or both, arises and claim is made within five years after the death of the person in the service.

The following tables show the details of the military and naval compensation awards on account of death or disability.

TABLE II.—*Statement of number of claims for military and naval compensation, due to death of men in the service, awarded in the fiscal year ended June 30, 1919.*

Claims originally awarded for death.....	23, 628
Claims originally awarded for disability and changed later to awards for death.....	177
Total claims awarded for death in fiscal year 1919.....	23, 805
Claims on which payments have been terminated or suspended in fiscal year 1919.....	424
Total cases on account of death, active on June 30, 1919.....	24, 827

TABLE III.—*Statement of number of claims for military and naval compensation due to disability of the men in the service, awarded in the fiscal year ended June 30, 1919.*

Claims originally awarded for disability.....	31, 962
Disability cases changed later to death.....	177
Net disability claims awarded in fiscal year 1919.....	31, 785
Claims on which payments have been terminated or suspended in fiscal year 1919.....	5, 294
Total disability claims active on June 30, 1919.....	27, 517

TABLE IV.—*Statement of number of claims and amount of monthly awards of military and naval compensation due to death of the men in the service, for the fiscal year ended June 30, 1919.*

	Amount of monthly payment.
23, 805 Claims awarded for death.....	\$639, 564
424 Claims on which payments have been terminated or suspended....	10, 256
24, 827 Total cases on account of death, active on June 30, 1919.....	667, 949

TABLE V.—*Statement of number of claims and amount of monthly awards of military and naval compensation due to disability of the men in the service, for the fiscal year ended June 30, 1919.*

	Amount of monthly payment.
31, 785 Net claims awarded for disability.....	\$995, 390
5, 294 Claims on which payments have been terminated or suspended....	171, 405
27, 517 Total cases on account of disability active on June 30, 1919.....	876, 920

TABLE VI.—*Statement of number and amount of monthly awards of military and naval compensation, death and disability, for the period ended June 30, 1919.*

	Amount of monthly payment.
52, 344 Claims awarded for death and disability active on June 30, 1919..	\$1, 544, 869
5, 783 Total cases, death and disability on which payments have been terminated or suspended.....	183, 599
58, 127 Total claims awarded during the period from Oct. 6, 1917, to June 30, 1919.....	1, 728, 468

Whenever possible disabled men, to whom it is necessary to furnish hospital treatment, are sent to hospitals maintained by the United States Public Health Service. When men can not be moved or when private institutions offer better facilities, use is made of hospitals other than those maintained by the Government.

The following tables show the number of cases treated under the direction of the Bureau:

TABLE VII.—*Cases treated in the United States Public Health Service hospitals, distributed by nature of disease, fiscal year ended June 30, 1919.*

	Admissions.	Discharges.	Remaining for treatment.
General diseases.....	2,902	2,152	750
Neuro-psychiatric.....	430	227	203
Tuberculosis.....	1,529	802	667
Total for all diseases.....	4,861	3,241	1,620

Cases treated in hospitals other than those of the Public Health Service, distributed by nature of disease, fiscal year ended June 30, 1919.

	Admissions.	Discharges.	Remaining for treatment.
General diseases.....	344	230	114
Neuro-psychiatric.....	1,349	517	850
Tuberculosis.....	1,424	729	695
Total for all diseases.....	3,117	1,476	1,659

Cases treated in all hospitals, distributed by nature of disease, fiscal year ended June 30, 1919.

	Admissions.	Discharges.	Remaining for treatment.
General diseases.....	3,246	2,382	864
Neuro-psychiatric.....	1,779	744	1,053
Tuberculosis.....	2,953	1,591	1,362
Total for all diseases.....	7,978	4,717	3,279

The rate of expenditures from the appropriations for "Military and naval compensation" has increased very rapidly during the year.

The following table shows the expenditures by months:

TABLE VIII.—*Statement of appropriation and expenditures "Military and naval compensation" from July 1, 1918, to June 30, 1919.*

Month.	Total appropriation to July 1, 1918.	Expenditures.	Accumulated expenditures.	Unexpended balance.
Period ending June 30, 1918.....	\$12,150,000		\$341,365.27	\$11,808,634.73
July, 1918.....		\$210,441.62	\$210,441.62	11,598,193.11
August, 1918.....		259,444.92	469,886.54	11,338,748.19
September, 1918.....		265,103.89	734,990.43	11,073,644.30
October, 1918.....		363,872.26	1,098,862.69	10,709,772.04
November, 1918.....		398,393.71	1,497,256.40	10,311,378.33
December, 1918.....		476,794.29	1,974,050.69	9,834,584.04
January, 1919.....		670,118.10	2,644,168.79	9,164,465.94
February, 1919.....		1,065,827.51	3,709,996.30	8,098,638.43
March, 1919.....		1,309,937.13	5,019,933.43	6,788,701.30
April, 1919.....		1,995,008.09	7,014,941.52	4,793,693.21
May, 1919.....		1,959,751.87	8,974,693.39	2,833,941.34
June, 1919.....		2,326,649.26	11,301,342.65	507,292.08

The following table shows the detail of expenditures during fiscal year, 1919.

TABLE IX.—*Statement of appropriation for military and naval compensation, fiscal year 1919.*

Balance June 30, 1918.....	\$11, 808, 634. 73
Expenditures:	
Monthly awards.....	\$9, 370, 932. 15
Physical examinations.....	6, 559. 21
Hospital services.....	298, 408. 72
Medical and surgical services.....	20, 133. 32
Traveling expenses.....	9, 791. 01
Transportation.....	50, 085. 31
Supplies.....	17, 147. 61
Burial expenses.....	1, 528, 285. 32
Total.....	11, 301, 342. 65
Unexpended balance, June 30, 1919.....	507, 292. 08

Military and naval insurance.

Automatic insurance is the protection against death or total permanent disability afforded by the Government to the amount of \$4,500 for men who died or became totally permanently disabled in the active service in the period from April 6, 1917, to February 12, 1918. All the men in the service were given to February 12, 1918, or until 120 days after enlistment to apply for contract insurance. The law was later amended to allow them until April 12, 1918, or until 120 days after enlistment in which to apply for contract insurance. Contract insurance is issued in multiples of \$500 with a minimum amount of \$1,000 and a maximum amount of \$10,000. The total cost of automatic insurance is borne by the taxpayer. Under contract insurance the insured pays the normal peace-time cost of insurance; the expense of administration and the excess cost due to the war is borne by the Government. Because of the fundamental difference between contract and automatic insurance a separation of the number of cases under each is made in the following tables.

It was during the past fiscal year that the largest number of death claims for insurance were received by the bureau and were disposed of. Permanent total disability claims for insurance began to come in more rapidly during the latter part of the fiscal year, and the bureau is at present concerned with their investigation and in making awards.

Table I is an analysis of the disposition of the claims due to death and permanent total disability which have been received by the bureau. It indicates, in addition to the number of cases which have not been allowed or disallowed, the number of cases upon which payments are not being made, and the reasons therefor, where investigations are completed.

TABLE I.—*Statement of number of military and naval insurance claims due to death of disability for the period Oct. 6, 1917, to June 30, 1919.*

Claims received.....	117,885
Claims allowed.....	105,050
Automatic insurance:	
No payments being made—	
No relatives entitled to benefits.....	527
No payments being made—	
Awardee alien enemy.....	6
No valid claim existing under law.....	79
Total.....	612
Contract insurance:	
No payments being made—	
No relatives entitled to benefits.....	263
No payments being made—	
Awardee alien enemy.....	6
No valid claim existing under law.....	122
Total.....	391
Total automatic and contract insurance claims disposed of.....	106,053
Claims pending.....	11,832

Tables II, III, and IV make comparisons between the number of cases for contract and automatic insurance, amounts of insurance, and amount of monthly payments awarded during the fiscal year 1918, and during the fiscal year 1919. They also give the total number of claims for death and disability upon which there are awards actively running on June 30, 1919. When the beneficiary dies the payment of the award must at least be temporarily suspended until the next beneficiary is located. If there is no other relative within the permitted class, then the award must be permanently terminated.

TABLE II.—*Statement of number of claims for contract and automatic insurance, death and disability, June 30, 1919:*

	Automatic.	Contract.	Total.
Death:			
Claims awarded, fiscal year 1918.....	2,363	4,733	7,096
Claims awarded, fiscal year 1919.....	2,497	94,892	97,389
Total claims awarded to June 30, 1919.....	4,860	99,625	104,485
Claims terminated or suspended to June 30, 1919.....	69	297	366
Claims active on June 30, 1919.....	4,791	99,328	104,119
Disability:			
Claims awarded, fiscal year 1918.....	17	3	20
Claims awarded, fiscal year 1919.....	103	442	545
Total claims awarded to June 30, 1919.....	120	445	565
Claims terminated or suspended to June 30, 1919.....	20	32	52
Claims active on June 30, 1919.....	100	413	513
SUMMARY.			
Total death and disability:			
Total claims awarded, fiscal year 1918.....	2,380	4,736	7,116
Total claims awarded, fiscal year 1919.....	2,600	95,334	97,934
Total claims awarded to June 30, 1919.....	4,980	100,070	105,050
Total claims on which payments have been suspended or terminated.....	89	329	418
Total claims active on June 30, 1919.....	4,891	99,741	104,632

TABLE III.—*Statement of amount of insurance involved in contract and automatic insurance claims awarded for death and disability, June 30, 1919.*

	Automatic.	Contract.	Total.
Death:			
Claims awarded, fiscal year 1918.....	\$10,633,500	\$40,425,500	\$51,059,000
Claims awarded, fiscal year 1919.....	11,236,500	875,148,840	886,385,340
Total claims awarded to June 30, 1919.....	21,870,000	915,574,340	937,444,340
Claims terminated or suspended to June 30, 1919.....	310,500	2,658,000	2,968,500
Claims active on June 30, 1919.....	21,559,500	912,916,340	934,475,840
Disability:			
Claims awarded, fiscal year 1918.....	76,500	30,000	106,500
Claims awarded, fiscal year 1919.....	463,500	3,735,040	4,198,540
Total claims awarded to June 30, 1919.....	540,000	3,765,040	4,305,040
Claims terminated or suspended to June 30, 1919.....	90,000	249,086	339,086
Claims active on June 30, 1919.....	450,000	3,515,954	3,965,954
SUMMARY.			
Total death and disability:			
Total claims awarded, fiscal year 1918.....	10,710,000	40,455,500	51,165,500
Total claims awarded, fiscal year 1919.....	11,700,000	878,883,880	890,583,880
Total claims awarded to June 30, 1919.....	22,410,000	919,339,380	941,749,380
Total claims terminated or temporarily suspended to June 30, 1919.....	400,500	2,907,086	3,307,586
Total claims active on June 30, 1919.....	22,009,500	916,432,294	938,441,794

TABLE IV.—*Statement of amount of monthly payments under awards of contract and automatic insurance, death and disability, June 30, 1919.*

	Automatic.	Contract.	Total.
Death:			
Claims awarded, fiscal year 1918.....	\$59,500.00	\$232,446.69	\$291,946.69
Claims awarded, fiscal year 1919.....	62,000.00	5,032,105.78	5,094,105.78
Total claims awarded to June 30, 1919.....	121,500.00	5,264,552.47	5,386,052.47
Cases on which payments have been terminated or suspended.....	1,725.00	15,283.50	17,008.50
Claims active on June 30, 1919.....	119,775.00	5,249,268.97	5,369,043.97
Disability:			
Claims awarded, fiscal year 1918.....	425.00	172.50	597.50
Claims awarded, fiscal year 1919.....	2,575.00	21,476.48	24,051.48
Total claims awarded to June 30, 1919.....	3,000.00	21,648.98	24,648.98
Cases on which payments have been terminated or suspended.....	500.00	1,432.25	1,932.25
Claims active on June 30, 1919.....	2,500.00	20,216.73	22,716.73
SUMMARY.			
Total death and disability:			
Total claims awarded, fiscal year 1918.....	59,925.00	232,619.19	292,544.19
Total claims awarded, fiscal year 1919.....	64,575.00	5,053,582.26	5,118,157.26
Total claims awarded to June 30, 1919.....	124,500.00	5,286,201.45	5,410,701.45
Total cases on which payments have been terminated or suspended.....	2,225.00	16,715.75	18,940.75
Total claims active on June 30, 1919.....	122,275.00	5,269,485.70	5,391,760.70

Table V indicates the total number of contract and automatic insurance cases awarded for death and disability, together with the amount of insurance involved for which active payments were being made on June 30, 1919.

TABLE V.—*Statement of amount of insurance involved in contract and automatic insurance claims awarded during the fiscal year ending June 30, 1919.*

	Amount of insurance.
7,096 Contract and automatic insurance claims awarded for death, fiscal year ending June 30, 1918.....	\$51,059,000
97,389 Contract and automatic insurance claims awarded for death, fiscal year ending June 30, 1919.....	886,385,340
104,485 Total contract and automatic insurance claims awarded for death to June 30, 1919.....	937,444,340
20 Contract and automatic insurance claims awarded for disability, fiscal year ending June 30, 1918.....	106,500
545 Contract and automatic insurance claims awarded for disability, fiscal year ending June 30, 1919.....	4,198,540
565 Total contract and automatic insurance claims awarded for disability to June 30, 1919.....	4,305,040
105,050 Total contract and automatic insurance claims awarded for death and disability to June 30, 1919.....	941,749,380
418 Total contract and automatic insurance cases for death and disability on which payments have been terminated or suspended.....	3,307,586
104,623 Total contract and automatic insurance claims awarded for death and disability, active on June 30, 1919.....	938,441,794

TABLE VI.—*Statement of appropriation and expenditures "Military and naval insurance" for fiscal year from July 1, 1918, to June 30, 1919.*

Date (period ending)—	Premiums credited to appropriation.	Total amount to credit of appropriation.	Expenditures during month.	Accumulated expenditures during fiscal year.	Unexpended balance.
June 30, 1918.....	\$23.45	\$23,000,023.45	.....	\$840,388.88	\$22,159,634.57
July 31, 1918.....	.....	.....	\$415,480.72	415,480.72	21,744,153.85
Aug. 31, 1918.....	.....	.....	838,515.55	1,253,996.27	20,905,638.30
Sept. 30, 1918.....	.....	.....	762,599.99	2,016,596.26	20,143,038.31
Oct. 31, 1918.....	.....	.....	1,140,250.75	3,156,847.01	19,002,787.56
Nov. 30, 1918.....	.....	.....	1,348,511.04	4,505,358.05	17,654,276.52
Dec. 31, 1918.....	.....	.....	1,558,405.92	6,063,763.97	16,095,870.60
Jan. 31, 1919.....	3,659,360.97	26,659,384.42	2,152,562.34	8,216,326.31	17,602,669.23
Feb. 28, 1919.....	972,299.36	27,631,683.78	5,603,106.81	13,819,433.12	12,971,861.78
Mar. 31, 1919.....	1,995,138.29	29,626,822.07	6,678,259.23	20,497,692.35	8,288,740.84
Apr. 30, 1919.....	45,111,689.32	74,738,511.39	9,529,573.92	30,027,266.27	43,870,856.24
May 31, 1919.....	63,507,220.59	138,245,731.98	6,760,024.23	36,787,290.50	100,618,052.60
June 30, 1919.....	57,311,506.59	195,557,238.57	7,011,067.43	43,798,357.93	150,918,491.76

It is, of course, to be understood that war risk insurance is payable only in monthly installments of \$57.50 for each \$10,000 of insurance. There is, therefore, a liability for each award to pay installments in the future which must be borne by these appropriations. Certain transfers from the pay of the Army, Navy, Marine Corps, etc., have still to be made to the credit of this appropriation.

BUREAU OF ENGRAVING AND PRINTING.

The output during the year was the greatest in the history of the Bureau of Engraving and Printing. There were engraved, printed, and delivered 447,464,105 sheets of finished work, of which 66,816,000 sheets of United States notes and certificates were delivered to the Treasurer of the United States; 13,500 sheets of 2 per cent, 3½ per cent, and 4 per cent United States registered bonds, 9,871,438 sheets of Liberty loan bonds, 4,569,740 sheets of gold notes of the United States Victory Liberty loan, 1,620,250 sheets of certificates of indebtedness to the Division of Loans and Currency; 7,090,269 sheets of national-bank currency, 56,809,000 sheets of Federal reserve currency, and 49,999,200 sheets of Federal reserve notes to the Comptroller of the Currency; 76,605,952 sheets of internal-revenue stamps (5,630,150,673 stamps) to the Commissioner of Internal Revenue; 270,250 sheets of customs stamps to the Division of Printing and Stationery; 142,316,519 sheets of United States postage stamps to postmasters on orders of the Postmaster General; 269,536 sheets of Philippine postage stamps to the Bureau of Posts, Manila, P. I., on orders of the Secretary of War; 1,761,500 sheets of Treasury national-bank circulating notes, certificates of indebtedness, and interim certificates for Philippine certificates of indebtedness, internal-revenue and documentary stamps, and postal cards to the government of the Philippine Islands on orders of the Secretary of War; 2,505 sheets of bonds and interim certificates for bonds, and 264,625 sheets of cigarette stamps to the government of Porto Rico on orders of the Secretary of War; 620 sheets of internal-revenue stamps to naval government, Virgin Islands, on order of the Secretary of the Navy; 1,330 sheets of postal savings certificates of deposit to postmasters; 771 sheets of postal savings bonds to Division of Loans and Currency; 387,135 sheets of Federal farm loan bonds and interim certificates for Federal farm loan bonds, and 87,236 sheets of bonds and interim certificates for joint-stock land banks to the Federal Farm Loan Bureau; 15,254,763 sheets of war-savings stamps to Treasurer of the United States, assistant treasurer at New York, Federal reserve banks, and post offices; 882,667 sheets of war-savings certificates to Post Office Department; and 12,569,299 sheets of checks, drafts, and miscellaneous to the Division of Printing and Stationery, of the office of the Secretary of the Treasury; aggregating 447,464,105 sheets. In addition to these impressions delivered, miscellaneous work was executed to the value of \$569,619.32, of which amount \$432,807.40 was reimbursed to the appropriations, \$4,767.44 charged to the appropriations, and \$132,044.48 deposited in the Treasury on account of miscellaneous receipts.

Compared with the deliveries in the fiscal year 1918 there was a decrease of 24.77 per cent in United States notes, certificates, and bonds; an increase of 179.16 per cent in national-bank and Federal reserve currency and Federal reserve notes; 16.11 per cent in United States postage stamps; 46.88 per cent in checks, drafts, and miscellaneous; and a decrease of 29.61 per cent in customs stamps; 14.2 per cent in internal-revenue stamps; 30.72 per cent in war savings stamps; or an average increase for all classes of 12.77 per cent, representing 50,673,820 sheets.

The face value of the sheets delivered aggregated the stupendous sum of \$48,754,644,581.82.

The acts of July 1, 1918, July 3, 1918, and July 11, 1919, contained \$6,098,007.26 for the bureau, and repayments for services and materials furnished the several executive departments and bureaus amounted to \$6,202,754.82, making the total available for the operations of the bureau \$12,300,762.08.

The expenditures for statutory salaries were \$214,849.83, for custody of dies, rolls, and plates \$8,283.33, for compensation of employees \$4,340,236.72, for wages of plate printers and printers' assistants \$2,974,743, for materials and miscellaneous expenses \$3,277,562.60, and for increase of compensation \$755,510.62, making a total of \$11,571,186.10 and leaving an unexpended balance of \$729,575.98, distributed as follows: Statutory salaries, \$31,860.17; custody of dies, rolls, and plates, \$116.67; compensation of employees, \$338,974.75; plate printing, \$113,497.78; and materials and miscellaneous expenses, \$245,126.61.

CUSTOMS.

The aggregate receipts of the Customs Service from all sources for the past fiscal year, according to the reports received from collectors of customs, amounted to \$186,241,435.89, an increase of \$1,390,079.49 as compared with the preceding fiscal year, and over \$112,000,000 less than was collected during the fiscal year ended June 30, 1914, immediately prior to the outbreak of the European War. With the formal restoration of peace, however, it is confidently expected that the customs duties collected under existing laws will gradually increase to their former proportions.

The value of imports for 1919 (exclusive of Porto Rico) amounted to \$3,091,369,329, an increase of \$146,309,926 over those of 1918, while the exports during the fiscal year 1919 amounted to \$7,224,867,829, an increase of \$1,296,582,188 over the exports of 1918, and nearly \$5,000,000,000 greater than the prewar exports reported for the fiscal year 1914.

The total expense of conducting the Customs Service during the past fiscal year was \$10,147,576, which amount represented an increase

of \$138,652 over the total expenses of the preceding fiscal year. It may be stated in this connection, however, that for the fiscal year 1919, \$500,000 was added to the regular customs appropriation to defray the salaries and other expenses incident to the customs enforcement of the "espionage" and "trading with the enemy" acts. By the adoption of frugal methods in the expenditure of this special fund, and repayments made to the appropriation for services performed for other departments, it was possible to return over \$400,000 of this amount to the Treasury unexpended.

Despite the fact that the continuation of the European War decreased the regular activities of the Customs Service, the past fiscal year has been a period of the greatest volume of work in the history of the Customs Service. As the war progressed in its intensity it became necessary to exercise the greatest vigilance to insure the enforcement of the restrictive measures adopted by the Government.

The department may well be proud of the manner in which the loyal and patriotic employees of the Customs Service met the numerous innovations in practice and procedure with which they were confronted during this critical period. For the first time in the history of the service it became necessary during the war to supervise and check with the utmost care the enormous volume of exports; to perform the tedious and vexatious censoring of communications outside of the regular course of the mails; to issue hundreds of thousands of water-front passes, seamen's identification cards, and licenses to vessels; to muster the crews of arriving and departing vessels and cause careful searches to be made of such vessels and their passengers for hidden contraband; to grant bunker licenses with exacting computations for food and fuel allowance; to clear vessels at all hours of the day and night to meet the naval requirements of the convoys; to convert the entire service into an auxiliary to the intelligence service, and to perform various other duties in hitherto untried fields.

Shortly after the signing of the armistice steps were taken to remove the restrictions which had been imposed on commerce as a war emergency, and conferences with that end in view were accordingly held by representatives of the Customs Service with those of other departments for which the Customs Service, during the war, had been to all intents and purposes a "clearing house" in the enforcement of the various war measures. As the result of these conferences, restrictions were gradually removed as far as consistent with the existing conditions, and while it is true that the espionage, trading with the enemy, and passport acts are still in force, the department felt justified, on June 30 last, in discontinuing the special force therefore employed, so that the war work that still remains to be performed, such as the issuance of seamen's passports and identifica-

tion cards, the checking of import and export licenses, and the inspection of passports, is now being performed by the regular force as a part of the customs routine.

The number of foreign vessels entering from and clearing to foreign ports during 1919 were 43,486 and 40,388, respectively, as against 42,682 and 42,277, respectively, during the fiscal year 1918. It may be stated that the increase in marine transactions throughout the country, dating from the signing of the armistice, indicates that with the removal of war restrictions our foreign trade is gradually returning to normal conditions.

Under the act of June 7, 1918, commonly referred to as the motor-boat act, collectors of customs are required to see that all motor boats in their districts are numbered and to impose and collect the penalties prescribed for failure to comply with the provisions of the act, under regulations promulgated by the Secretary of Commerce. These added duties have greatly increased the work in the marine divisions in the various custom houses throughout the country, for not only is it necessary to keep a record of the numbers assigned to every motor boat and the names and addresses of the owners thereof, but subsequent changes of ownerships must likewise be recorded. In some customs districts embracing large areas of water, it has been necessary to increase the office force especially to handle this work.

By reason of the passage of State and Federal prohibition laws, considerable activity has developed at the seaboard and particularly along the Mexican and Canadian frontiers in the smuggling of liquors, which has also appreciably increased the work of custom officers, and special measures had to be devised to meet this new situation. Persons caught smuggling liquors and narcotics into this country have been quickly punished, and as the result of the strict watch maintained and the severe penalties imposed, there is every likelihood that there will be a steady decline in traffic of this character.

During the past fiscal year the custom of holding an annual conference of collectors of customs and appraisers of merchandise, which had been suspended during the war, was resumed. At the recent conference many recommendations were made for improving the customs procedure and are now being considered by the department. The exchange of ideas with respect to customs practices, existing in the various customs districts at these annual conferences, has greatly strengthened the esprit de corps of the service and stimulated a genuine interest in the various administrative officers to improve the efficiency of the work of their respective districts to the highest possible degree.

With a view to reducing the expense of administration and of printing, and to simplify and standardize customs forms and accounting methods, a new accounting procedure was put into operation

throughout the service on April 1, 1919. Under the new method the office records and schedules of collections and disbursements are so arranged that they can be prepared by carbon process at one writing, the naval office records and the schedules for the Auditor for the Treasury Department being copies of the collector's records. Under the new accounting procedure 49 new forms take the place of 194 forms which were required under the former procedure, and the large saving in printing and stationery alone is very easily apparent. While the system has not been in operation long enough to warrant an estimate being given as to actual saving in time and labor that it will accomplish, it is safe to say that at the large naval office ports, the accounting work under the new procedure can be performed with less than half the force required under the old.

Under a recent change in practice, sanctioned by the Comptroller of the Treasury, moneys received under the night unlading act of February 13, 1911, for services of customs officers employed at night and on Sundays and holidays are accounted for as a special deposit, thus permitting of a more timely payment to the employees affected than was possible when such moneys were required to be deposited to the credit of a special fund, and payments made therefrom to the employees in interest.

In the above connection attention is invited to the fact that under the present practice moneys reimbursed for the services of storekeepers and other customs officers, though paid from the customs appropriation, are covered into the Treasury as "Miscellaneous receipts," in accordance with the act of March 4, 1907, which in part provides as follows:

* * * from and after the close of the fiscal year 1907, all sums received from fines, penalties, and forfeitures connected with the customs, and from fees paid into the Treasury by customs officers, and from storage, cartage, drayage, labor, and services, shall be covered into the Treasury as are other miscellaneous receipts.

As the amount of money to be expended in the Customs Service during a given fiscal year is limited to a fixed sum, considerable embarrassment is at times experienced by this department in passing upon applications of merchants for the establishment of bonded warehouses requiring the services of a storekeeper, as well as applications of transportation companies for the stationing of men for inspecting duties at places other than customs ports. While the salaries of these classes of officers are reimbursed to the Government they are actually paid from the fixed customs appropriation, and inasmuch as the demand for the establishment of bonded warehouses fluctuates according to the prevailing business conditions throughout the country there is no certainty of determining even the approximate number of such warehouses which may be established

during the fiscal year. It may very easily happen, therefore, that the officer responsible for keeping the customs expenses within the limit of the appropriation in passing upon the merits of applications for the establishment of bonded warehouses, or for the assignment of customs men to special duties for the accommodation of railroad companies, is influenced in his decision more by the fact as to whether the appropriation can stand the additional expense involved than by the real business necessity which exists for the action requested.

In this connection it may be stated that at the present time the proprietors of warehouses at San Francisco and New York have signified their willingness to increase the salaries of storekeepers in those cities \$200 each per annum, which increase though without expense to the Government, can not be authorized for the reason that there are not sufficient customs funds available for this purpose.

It is accordingly recommended that action be taken to secure an amendment to the act of March 4, 1907, so as to exclude the services of storekeepers and other officers therefrom, and permit the handling of the moneys received on this account in the same manner as reimbursable services rendered under the night unlading act of February 13, 1911; that is, payments made from this source be placed in the collectors' special deposit accounts, and disbursements made direct therefrom by check to the storekeeper, inspector, or other officer performing the service.

Attention is again invited to the efficient and thorough manner in which the men of the Customs Service performed the arduous and intricate duties which devolved upon them during the critical period of the war. They are entitled to special commendation for the patriotic spirit manifested by them in remaining at their posts at salaries far insufficient to meet the prevalent high cost of living, notwithstanding inducements offered them to enter private employ at greatly increased compensations. It is perhaps unnecessary to dwell upon the hardships these men have been subjected to, nor to the actual cases of distress and suffering which have been brought to the attention of the department, but it should be pointed out that some of these men are approaching the limit of endurance and that unless some immediate measure of relief is afforded to meet the growing feeling of discontent, a disintegration of the present efficient organization, which it has taken years of painstaking effort to build up in the Customs Service, seems inevitable.

During the war, men of unusual ability, at great personal sacrifice, remained at their posts from purely patriotic motives, but the termination of hostilities has naturally freed them of this obligation, with the result that the service is being depleted to an alarming extent because these younger and more efficient men are resigning from the

service. At the port of Norfolk alone, the number of resignations from the date of the signing of the armistice to the close of the past fiscal year, a period of eight months, represented approximately 50 per cent of the entire force employed. The difficulty experienced in retaining capable men in the Customs Service is furthermore a hardship to collectors of customs charged with the responsibility of conducting the affairs of their districts along the required standards of efficiency, and it is to be hoped that the conditions referred to will in some manner be remedied.

Tea inspection.

According to the annual report of the supervising tea examiner, the total amount of tea imported and examined, under the Tea Act of March, 1897, during the fiscal year 1919 was 113,338,535 pounds, of which 1,420,568 pounds, or 1.25 per cent, were rejected by the tea examiners as not being equal to the Government standards in quality. Of these rejections 939,187 pounds, or 66 per cent, were appealed to the United States Board of Tea Appeals by the importers, and of the total amount appealed 898,450 pounds, or 95.8 per cent, were finally rejected and 39,737 pounds, or 4.2 per cent, were finally admitted. The 39,737 pounds finally admitted by the United States Board of Tea Appeals brings the total amount that was finally imported for human consumption to 111,957,704 pounds and reduces the amount finally rejected to 1,379,831 pounds, or 1.2 per cent, of the total amount examined.

During the fiscal year there were no rejections for impurities (artificial coloring, facing, etc.). This is the first year since the campaign against artificially colored teas was begun that no teas whatever containing artificial color have sought entrance into the United States. The success of this reform is due to the enthusiastic support given the department by the tea importers of this country as well as the support given by the tea producers and exporters of the Far East. The value of the reform is that it removes the fictitious value that was placed upon some teas by concealing their inferiority and places the tea business on a more equitable basis.

The large percentage of rejections for India, Japan dust, and Java and Sumatra teas was due to the fact that much of these teas just slightly below the Government standards were brought in for human consumption with the hope that they would pass the Government standard and escape the cent-a-pound duty that is placed on teas when imported for manufacturing purposes, because upon being rejected they were reentered for the latter purpose.

The total importations this year are much smaller than last year due to the fact that during the war the importers, fearing restrictions

on tea, brought in much more than in normal times, notwithstanding that the insurance and freight rates were exceedingly high.

In studying the table comparing the importations for the last three fiscal years it is interesting to note that the large importations of teas from the Dutch East Indies made during the war, when they had practically no other market, are continuing after the war, and shows in a pronounced way the effects of the war on this branch of our foreign trade.

According to the report of the Department of Commerce during the fiscal year 1919, more than 15,000,000 pounds of tea have been exported to foreign countries largely to meet the demands of European countries immediately after the war. Most of this tea was taken from the stock imported during 1918.

A deduction of the amount of tea exported from the total amount of tea imported in the last three years shows that, for that period, our average annual consumption amounted to over 116,000,000 pounds.

Recapitulation of statistical tables for fiscal year ended June 30, 1919.

	Pounds exam- ined.	Per cent of total ex- amined.	Pounds passed.	Pounds rejected.	Per cent rejected.
Variety:					
Formosa Oolong.....	20,247,454	17.86	20,138,089	109,365	0.54
Foochow Oolong.....	2,878	.0025	2,878		
China Congou.....	1,701,704	1.50	1,698,787	2,917	.17
India.....	5,359,853	4.73	4,634,092	725,761	13.54
Ceylon.....	12,979,293	11.45	12,979,193	100	.00077
Java and Sumatra.....	26,152,301	23.07	25,867,706	284,595	1.09
Ceylon Green.....	119,075	.105	119,075		
Ping Suey Green.....	7,136,278	6.29	7,125,513	10,765	.15
Country Green.....	1,643,176	1.45	1,642,411	765	.046
Japan.....	34,200,136	30.18	33,996,656	203,480	.59
Japan Dust.....	3,190,589	2.80	3,144,657	45,932	1.44
Scented Orange Pekoe.....	23,034	.02	23,034		
Scented Canton.....	366,515	.32	366,115	400	.11
Canton Oolong.....	192,926	.17	158,801	34,125	17.69
Formosa Congou.....	5,400	.0047	3,560	1,840	34.11
Japan Congou.....	8,580	.0075	8,580		
China brick tea.....	9,343	.0082	8,820	523	5.59
Total.....	113,338,535		111,917,967	1,420,568	
By districts:					
Boston.....	6,131,935	5.41	6,121,670	10,265	.17
Chicago.....	9,143,276	8.06	8,206,278	936,998	10.25
Honolulu.....	384,263	0.34	383,346	917	.24
New York.....	34,790,271	30.69	34,708,086	82,185	.24
Puget Sound.....	46,070,625	40.65	45,714,828	355,797	.77
St. Paul.....	1,289,446	1.12	1,289,446		
San Francisco.....	15,528,719	13.70	15,494,313	34,406	.22
Total.....	113,338,535		111,917,967	1,420,568	

NOTE.—The rejections recorded above indicate those made by the tea examiners and not the final rejections made by the U. S. Board of Tea Appeals.

Table showing the varieties of tea and the countries of origin, as well as port of examination, of all teas entering the United States during the three last fiscal years.

	Pounds, 1917.	Per cent of total, 1917.	Pounds, 1918.	Per cent of total, 1918.	Pounds, 1919.	Per cent of total, 1919.
Kind of tea:						
Green.....	45,333,340	42.77	46,665,737	31.39	46,289,254	40.84
Oolong.....	21,317,813	20.11	19,062,635	12.81	20,809,773	18.36
Black.....	39,330,005	37.11	82,956,012	55.79	46,239,508	40.79
Total.....	105,981,158		148,684,384		113,338,535	
Countries:						
Ceylon and India.....	28,632,215	27.02	44,395,552	29.86	18,458,221	16.29
China.....	20,375,569	19.23	23,693,932	15.94	11,075,854	9.77
Japan and Formosa.....	54,833,093	51.74	52,316,298	35.19	57,652,159	50.87
Dutch East Indies (Java and Sumatra).....	2,140,281	2.02	28,278,602	19.02	26,152,301	23.07
Total.....	105,981,158		148,684,384		113,338,535	
Examinations by districts:						
Boston.....	8,137,029	7.67	7,036,537	4.73	6,131,935	5.41
Chicago.....	16,162,102	15.25	8,220,680	5.53	9,143,276	8.06
Honolulu.....	378,170	.36	290,280	.20	384,263	.34
New York.....	31,837,763	30.04	43,643,914	29.35	34,790,271	30.69
Puget Sound.....	32,107,891	30.30	45,586,944	30.66	46,070,625	40.65
St. Paul.....	4,502,728	4.25	1,450,988	.98	1,289,446	1.13
San Francisco.....	12,855,475	12.13	42,454,941	28.55	15,528,719	13.70
Total.....	105,981,158		148,684,384		113,338,535	

OFFICE OF THE SUPERVISING ARCHITECT.

The following statements show in general the projects authorized by Congress, and in detail the financial operations of the Office of the Supervising Architect for the fiscal year ended June 30, 1919:

BUILDINGS.

New buildings completed (occupied or ready for occupancy) at the close of the fiscal year ended June 30, 1918.....	1,139
Purchase completed (Galveston, Tex., appraiser's stores).....	1
Number of marine hospitals and quarantine stations.....	55
New buildings completed during fiscal year ended June 30, 1919.....	67
Net total number of buildings (completed) under the control of the Treasury Department June 30, 1919.....	1,262
Buildings placed under contract during the fiscal year ended June 30, 1919.....	13
Buildings placed under contract prior to the commencement of the fiscal year 1919 and not completed June 30, 1919.....	14
Contracts for new buildings in force July 1, 1919.....	27
Total number of buildings completed and in course of erection June 30, 1919.....	1,289
Buildings authorized prior to the act of Mar. 4, 1913, not under contract June 30, 1919.....	16
Buildings authorized in acts of Mar. 4 and June 23, 1913; Mar. 4, 1915; July 26, 1916; and Mar. 4, 1917, not under contract June 30, 1919.....	140
Total.....	156
Total buildings completed, in course of erection, or authorized (not including extensions).....	1,445

EXTENSIONS.

Extensions completed (occupied or ready for occupancy) during the fiscal year ended June 30, 1919.....	6
Extensions placed under contract during the fiscal year ended June 30, 1919.....	0
Extensions placed under contract prior to July 1, 1918, and not completed June 30, 1919.....	2
Contracts for extensions in force July 1, 1919.....	2
Extensions authorized prior to act of Mar. 4, 1913, not under contract June 30, 1919.....	1
Extensions authorized in acts of Mar. 4, 1913, and Mar. 4, 1917, not under contract June 30, 1919.....	8
Extensions authorized but not under contract June 30, 1919.....	9

RECAPITULATION.

Contracts completed during the fiscal year ended June 30, 1919:	
New buildings.....	67
Extensions.....	6
Total.....	73
Contracts awarded during the fiscal year ended June 30, 1919:	
New buildings.....	13
Extensions.....	0
Total.....	13
Contracts awarded prior to July 1, 1918, not completed June 30, 1919:	
New buildings.....	14
Extensions.....	2
Total.....	16
Contracts in force July 1, 1919, regardless of date of award:	
New buildings.....	27
Extensions.....	2
Total.....	29

The above statement does not include the following:

Major miscellaneous contracts awarded from July 1, 1918, to June 30, 1919.....	26
Miscellaneous contracts chargeable to the special allotment of \$200,000, under the appropriation "Repairs and preservation of public buildings, 1919"....	24
Minor miscellaneous acceptances, approximately.....	750

STATEMENT OF APPROPRIATIONS MADE DURING THE FISCAL YEAR ENDED JUNE 30, 1919.

Summary of acts carrying appropriations for the fiscal year 1919.

The sundry civil act approved July 1, 1918, carried appropriations as follows:

For buildings only.....	\$1,428,049.00
For extensions, alterations, etc.....	229,800.00
For rent of buildings.....	14,400.00
For marine hospitals.....	17,500.00
For quarantine stations.....	98,000.00
Total.....	\$1,777,749.00

On account of annual appropriations:

For repairs and preservations.....	\$1, 000, 000. 00
For mechanical equipment.....	500, 000. 00
For vaults and safes.....	175, 000. 00
For general expenses.....	525, 000. 00
For operating force.....	3, 500, 000. 00
For furniture and repairs of same.....	650, 000. 00
For operating supplies.....	2, 065, 000. 00
For Salamanca, New York, ground rent.....	7. 50

Total..... \$8, 415, 007. 50

Reappropriated on account of architectural competitions..... 39, 929. 76

Total, this act..... 10, 242, 686. 26

The legislative act approved July 3, 1918, carried an appropriation for "Salaries, Office of Supervising Architect," in amount..... 221, 020. 00

The urgent deficiency act approved July 8, 1918, carried an appropriation for "Operating supplies," in amount..... 150, 000. 00

The urgent deficiency act approved Nov. 4, 1918, carried appropriations as follows:

Repairing post office, courthouse, etc., Chicago, Ill...	\$22, 000. 00
Rent of buildings.....	16, 000. 00
Quarantine stations.....	166, 000. 00

Total, this act..... 204, 000. 00

The urgent deficiency act approved Feb. 25, 1919, carried an appropriation for the completion of remodeling, repair, etc., of the custom-house, New Orleans, La., in amount..... 13, 700. 00

Total amount appropriated for fiscal year 1919..... 10, 831, 406. 26

Summary of acts carrying appropriations for the fiscal year 1920.

The legislative act approved March 1, 1919, carried an appropriation for "Salaries, Office of Supervising Architect," in amount \$221,020. The sundry civil act, not having been approved until after the close of the fiscal year 1919, does not appear in this report. It will appear in the annual report for the fiscal year ending June 30, 1920.

STATEMENT OF APPROPRIATIONS FOR PUBLIC BUILDINGS JULY 1, 1918, TO JUNE 30, 1919.

Expenditures during the fiscal year.

For statutory roll.....	\$212, 478. 14
For sites and additional land.....	\$101, 150. 00
For construction of new buildings.....	7, 057, 014. 43
For extensions to buildings.....	1, 167, 394. 47
For special repairs of buildings.....	165, 859. 09
For rent of buildings.....	33, 496. 31
	8, 524, 914. 30
For repairs and preservation.....	939, 331. 45
For mechanical equipment.....	439, 362. 37
For vaults and safes.....	125, 959. 25
For operating supplies.....	2, 324, 457. 97
For general expenses.....	463, 079. 39
For furniture and repairs of same.....	732, 659. 63
For operating force.....	3, 251, 222. 83
For architectural competitions.....	2, 951. 24
Total.....	17, 065, 416. 57

Contract liabilities existing at close of business June 30, 1919.

On account of statutory roll		
On account of sites and additional land.....	\$103,225.00	
On account of construction of new buildings.....	5,424,788.83	
On account of extensions to buildings.....	706,005.04	
On account of special repairs to buildings.....	32,490.67	
On account of rent of buildings.....	188.17	
Total.....	6,266,697.71	
Less authorized contract liabilities in excess of amounts appropriated under the special appropriations.....	452,503.97	\$5,814,193.74
On account of repairs and preservation.....		336,554.65
On account of mechanical equipment.....		211,649.50
On account of vaults and safes.....		70,483.24
On account of operating supplies.....		357,880.41
On account of general expenses.....		33,454.07
On account of furniture and repairs of same.....		324,798.25
On account of operating force.....		357,837.18
On account of architectural competitions.....		18,762.71
Total.....		7,525,613.75

Unencumbered balances July 1, 1919.

For statutory roll:		
1918.....		\$12,418.20
1919.....		17,102.98
For sites and additional land only.....	\$2,065,952.64	
For construction of new buildings.....	9,537,797.90	
For extensions to buildings.....	2,110,325.01	
For special repairs to buildings.....	473,217.19	
For rent of buildings.....	62,997.50	
		14,250,290.24
For repairs and preservation:		
1918.....		2,609.00
1919.....		3,344.87
For mechanical equipment:		
1918.....		5,974.96
1919.....		5,652.17
For vaults and safes:		
1918.....		2,905.99
1919.....		96,137.78
For operating supplies:		
1918.....		3,273.69
1919.....		(¹)
For general expenses:		
1918.....		53,100.43
1919.....		68,167.60
For furniture and repairs of same:		
1918.....		700.92
1919.....		1,737.63
For operating forces:		
1918.....		164,779.02
1919.....		180,990.39
For lands and other property:		
1918.....		298.90
1919.....		300.00
For architectural competitions:		
1919.....		18,215.81
Total.....		14,888,000.58

¹ Deficiency, \$332,644.09.

Balances of appropriations sent to surplus fund June 30, 1919.

On account of annual appropriations, to wit:

Furniture and repairs of same for public buildings, 1917.....	\$54, 248. 11
General expenses of public buildings, 1917.....	11, 403. 39
Lands and other property of the United States, 1917.....	300. 00
Mechanical equipment for public buildings, 1917.....	5, 230. 92
Operating force for public buildings, 1917.....	4, 397. 79
Operating supplies for public buildings, 1917.....	5, 080. 47
Repairs and preservation of public buildings, 1917.....	5, 185. 09
Vaults and safes for public buildings, 1917.....	844. 74
Total.....	86, 690. 51

PUBLIC HEALTH SERVICE.

The operations of the Public Health Service during the fiscal year 1919 are summarized by the Surgeon General as follows:

Division of Scientific Research.

Upon the signing of the armistice, the division turned its attention to rendering all assistance possible to the program for the continuation and extension of measures for the general protection and improvement of the public health.

Anthrax.—An investigation was made with reference to the occurrence of anthrax, the infection having been found on shaving brushes secured in the open market. As a result the interstate quarantine regulations were amended to control the manufacture of shaving brushes.

Cerebrospinal meningitis.—Investigations of outbreaks of this disease were made at a number of points, and advice was given in regard to the control of the disease.

Malaria.—Malaria investigations during the past year have been limited mostly to work in the extra-cantonment zones, the intensive control operations being supervised by sanitary engineers of the service. Some special problems in malaria control were studied in connection with this work. In addition, surveys were made on request of the State and local health authorities in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, and Oklahoma. Cooperation with the railroads of the South in the supervision of malaria-control work was continued. In so far as possible laboratory and biological studies of special malaria problems were made at the headquarters in New Orleans, and at other points.

Pellagra.—The study of the value of certain single foods as a preventive of pellagra, when added to the diet of a group of inmates in an asylum in which cases of pellagra were ordinarily of frequent occurrence, was continued during the year. Valuable results are expected from this study.

The collection of data with regard to factors influencing pellagra prevalence in cotton-mill villages was practically completed during the fiscal year and reports on the several phases of this comprehensive investigation are now in preparation.

In addition, clinical and laboratory investigations of pellagra have been continued at the service pellagra hospital at Spartanburg, S. C., consisting of dietary treatment of 133 patients and 45 out-patients.

Trachoma.—At the close of the fiscal year five trachoma hospitals were in operation, being located at Pikeville, Jackson, and Greenville, Ky., Tazewell, Tenn., and LaMoure, N. Dak. These hospitals have been operated for the purpose of suppressing trachoma at points where it is most prevalent. In addition, field clinics have been held at various points, and these have proved to be of great advantage, both in giving instructions in the diagnosis and treatment of trachoma, and in educating the public in the prevention of the disease.

Surveys of the prevalence of trachoma have been made in a number of States. The importance of this disease as a public health problem is indicated in the fact that it is gradually spreading to parts of the country which previously had been free from it. In so far as facilities permitted, laboratory and other studies have been made in regard to the disease.

Typhoid fever.—In addition to the rural sanitation work of the service, which has dealt primarily with the prevention of typhoid fever and similar diseases, special studies have been made in regard to the cause of outbreaks of typhoid fever at a number of places.

Rural sanitation.—Studies of and demonstrations in rural sanitation under a special appropriation from Congress were continued during the past fiscal year. The demonstrations have been made in the following counties: Bibb, DeKalb, Glynn, Muskogee, and Walker Counties, Ga.; Calhoun, Madison, Lauderdale, Colbert, and Talladega Counties, Ala.; Cumberland, Edgecombe, Wake, and Durham Counties, N. C.; Charleston County, S. C.; Davidson and Hamilton Counties, Tenn.; Harris, McLennon, Orange, and Tarrant Counties, Tex.; Harrison County, Miss.; Mason County, Ky.; Ottawa County, Okla.; Cherokee County, Kans.; Jasper County, Mo.; and Norfolk and eight other counties in Virginia.

The expenditures of the service for the demonstration phases of the work in each of these counties were met by at least an equal amount of funds furnished from State and local sources. Frequently the counties appropriated much more for the work than was allotted by the service. In most cases these counties comprised wholly or partially rural areas adjacent to cantonments or to large and important war industries. The demonstration consequently not only subserved its normal purpose of improving rural sanitation conditions,

but also operated to furnish immediate sanitary protection to a large number of troops or workers in war industries. One of the primary objects in this rural sanitation work has been to assist in the establishment of a permanent, adequate health organization in the counties in which demonstrations were conducted, such organization to be financed wholly or in great part by the county. This object has been attained in virtually all of the counties in which work was carried out.

Public health organization and administration.—The war necessarily interrupted the studies of public health organization and administration which had previously been conducted by the division in a large number of States and cities. However, the study of county health work in Edgecombe County, N. C., was continued until the end of the fiscal year, and it is believed considerable data of importance in improving rural sanitation has been secured. The service assigned an officer to the city of Boston, to assist in solving problems of public health administration in that city. Following a survey of public health administration in the State of New Mexico, the service detailed an officer to act temporarily as health officer of the State in order to assist in the reorganization of the health department of that State.

Office of Industrial Hygiene and Medicine.—By an executive order of July 1, 1918, the Public Health Service was placed in charge of sanitary or public health activities connected with the prosecution of the war. For the conduct of this work, an office of industrial hygiene and medicine was organized, and district headquarters were established in a number of the large cities of the country. The work of this office was carried out in cooperation with the Working Conditions' Service of the Department of Labor. In addition to making studies and surveys of sanitary conditions in industries such as have been made in previous fiscal years, the division, to a large extent, actually supervised health conditions in plants making munitions and other war supplies, especially those under the control of the Government. Upon the signing of the armistice the service ceased to exercise sanitary supervision of industrial plants, but continued to give advice as to sanitary improvements and medical service, and to conduct special studies in regard to problems of industrial hygiene.

Shipyard sanitation.—Under the presidential order just referred to, the service assumed supervision of activities in connection with the health and sanitation of shipyards under control of the Emergency Fleet Corporation. The corporation gave financial assistance to the work until the middle of February. The service also made sanitary surveys, and took all action possible to improve sanitary conditions in communities in which important shipyards were located. The sanitary control assumed by the service was necessarily discontinued

at the end of the fiscal year, owing to the fact that Congress did not make an appropriation for continuing the work.

Child hygiene.—The experiences of the war, and especially the lessons of the draft, the rehabilitation of devastated areas and the reconstruction problems of the warring nations, all serve to focus the attention of the world upon problems of child hygiene as never before in the history of mankind. Owing to small appropriations the activities of the service in this field have been limited, but the service has made such studies in regard to child hygiene as were practicable. As a part of the general plan of the control of communicable diseases careful health supervision of the schools in these districts was maintained during the past year, wherein 168,357 children were examined for the presence of communicable diseases and incidentally for the detection of hampering physical defects. The work in the schools was supplemented by visits to the homes by nurses, and advantage was taken of the opportunity to instruct parents in matters relating to the health of children. Infant welfare clinics were established in eight zones, and three dental clinics for school children also were operated.

Mental hygiene.—Intensive psychiatric studies were carried on at the State Industrial Farm for Women at Lansing, Kans. A physical and mental study of 100 delinquent women was made in the city of Louisville, Ky. These studies showed that a large percentage of these women were feeble minded, or otherwise abnormal mentally, and that many of them had a limited comprehension of the principles of personal hygiene.

Water supply and sewage disposal.—A number of investigations have been made in order to give advice as to securing proper water supplies and adequate sewage disposal, particularly in places such as cantonments, naval establishments and plants making war materials.

The cooperation of the service with the Capital Issues Committee whereby advice was furnished as to the immediate necessity from a public health standpoint of bond issues and capital expenditures for sanitary improvements was continued until the signing of the armistice. Such advice was given in the case of projects in not less than 45 cities from July 1 until the close of the war, in some cases involving an expenditure of millions of dollars.

Studies of industrial waste were continued, the treatment plant for purifying tannery wastes at Luray, Va., remaining in operation until the end of the fiscal year. It has been demonstrated in these studies that industrial wastes can, in many cases, be purified at comparatively low cost. Reports of these studies are now being published.

Hygienic Laboratory.—The Hygienic Laboratory during the past year studied the question of transmission of influenza from person

to person and conducted other laboratory investigations of the disease. Special studies were made of serums and vaccines for diseases such as anthrax, cerebrospinal meningitis, pneumonia and rabies. Other studies have related to dried milk, methods of detection and prevention of trinitrotoluol and other industrial poisonings, and improving the methods for the manufacture of arsphenamine and nearsphenamine.

Apart from specimens received in connection with the enforcement of the Biologics law, specimens of all kinds have been examined. Nineteen hundred and eighty-eight antirabic treatments and 776,163 c. c. of typhoid vaccine were distributed during the year.

Control of biological products.—Owing to the war, demands for such important preparations as typhoid vaccines, smallpox virus, antimeningococcic and antipneumococcic serums, increased enormously, and their manufacture and sale had to be supervised by the service with more care than ever before. All manufacturers of antimeningococcic and antipneumococcic serums have been requested to submit for examination in the Hygienic Laboratory, samples of every lot manufactured before release to insure the potency and purity of these products. In connection with the licensing of biological products 7,551 samples were examined.

Arsphenamine.—Assistance has been rendered to the Federal Trade Commission in licensing the manufacture and sale of arsphenamine and allied products as in the previous year. The service has continued studies in regard to the toxicity and chemotherapy of this drug, in order to safeguard its use.

Leprosy investigations.—Leprosy studies have been continued in Hawaii at the Leprosy Investigation Station in cooperation with the Quarantine Service, and with the local health authorities. Intensive experimental treatment has been carried out in the case of patients. In the case of all these patients the derivatives of chaulmoogra oil have apparently resulted in improvement, a large percentage having made very favorable progress.

Division of Interstate Quarantine.

Previous to the signing of the armistice, the energies of this division continued to be concentrated on work in extra-cantonment zones and other areas for the protection of the health of the military forces. Since the signing of the armistice this work was continued through the end of the fiscal year only about the permanent camps or those from which soldiers have been demobilized. Consequently the division has gradually been returning to its prewar routine, consisting of the supervision of the purity of water used for drinking and culinary purposes in interstate traffic, plague suppressive meas-

ures, and other activities in connection with the prevention of the interstate spread of diseases.

Interstate water supplies.—During the past year, in addition to the routine supervision of the purity of water used for drinking and culinary purposes in interstate traffic, there also has been conducted a comprehensive study of the general control of such water supplies for the purpose of adequately bringing their regulation up to date and for the utilization in cooperation through as great a degree as possible, of the existing departmental machinery of the various States. This study resulted in the amending of the existing regulations and the subsequent adoption of an improved form of certificate. In localities which are found to be weak in water-supply control, the Federal agency will supplement and otherwise aid the States during the current year. This plan of action received unanimous approval of the conference of State and Territorial health officers.

Plague suppressive measures.—Plague suppressive measures at New Orleans, La., and Seattle, Wash., have been continued, but with a reduced force since plague-infected rats have not been found in either place during the past year. Measures have been continued in and around San Francisco, Calif., with more emphasis being placed upon the ground-squirrel infection. No infected rats have been found in San Francisco since 1908. Infected ground squirrels have been found during the past year and it may be advisable to inaugurate a more intensive plan of hunting during the current fiscal year in order to obtain a more reliable index of their infectivity.

Selection of a suitable site for the national leprosarium.—The board for the selection of a suitable site for the national leprosarium has reached a tentative agreement. It is thought that construction of this institution will be begun before the end of the current fiscal year, and that Federal aid can be extended to those afflicted with leprosy.

Extra-cantonment zone sanitation.—Extra-cantonment zone sanitation has been continued under the joint direction of the Divisions of Domestic Quarantine and Scientific Research, with the assistance of the Bureau of Sanitary Service of the American Red Cross, and in cooperation with State and local health departments. Funds have been supplied by the above agencies and civic organizations for work in and around the individual localities. During the past fiscal year extra-cantonment zone work was conducted in areas about the following camps, training stations, and industrial plants with the most gratifying results:

Camp Beauregard.
Camp Bragg.
Camp Benning.
Camp Bowie.

Barron Field.
Carruthers Field.
Love Field.
Charleston Port Terminal.

Fort Moultrie.	Camp Lee.
Fort Sumter.	Camp Lewis.
Naval Training Station at Charleston, S. C.	Camp McArthur.
Camp Devens.	Rich Field.
Camp Dodge.	Camp McClellan.
Fort Des Moines.	Camp Meade.
Camp Pike.	Camp Merritt.
Eberts Field.	Muscle Shoals Industrial Plant.
Camp Logan.	Payne Field.
Ellington Field.	Park Field.
Park Place.	Camp Polk.
Camp Eustis.	Camp Sevier.
Camp Alexander.	Camp Shelby.
Camp Hill.	Camp Sheridan.
Camp Stuart.	Taylor Field.
Fort Monroe.	Camp Sherman.
Langley Field.	Fort Sill.
Camp Morrison.	Post Field.
Camp Funston.	Souther Field.
Fort Riley.	Camp Zachary Taylor.
Gersner Field.	Camp Knox.
Camp Gordon.	Camp Travis.
Camp Jesup.	Fort Sam Houston.
Fort McPherson.	Brooks Field.
Camp Greene.	Kelley Field No. 1.
Camp Hancock.	Kelley Field No. 2.
Camp Humphreys.	Camp Wadsworth.
Camp Joseph E. Johnston.	Camp Wheeler.
Camp Jackson.	Fort Oglethorpe.
Emerson Field.	Camp Forest.
Fort Leavenworth.	Camp Greenleaf.
	Old Hickory Powder Plant.
Army and naval supply bases at Portsmouth and Norfolk, Va.	
Naval training station at Gulfport, Miss.	
Naval training station at New London, Conn.	
Naval training station at Pensacola, Fla.	
Naval training station at Portsmouth, N. H.	
Munitions and explosive plant at Nitro, W. Va.	
Picric acid plant at Brunswick, Ga.	
Old Hickory Powder Plant at Nashville, Tenn.	

This work, which was instituted under the general authority of the Public Health Service in the zones around the first camps established, was subsequently carried out by the service in accordance with special authority conferred by Congress in Public Act No. 181, Sixty-fifth Congress, H. R. 12441, as follows:

Interstate quarantine service: For cooperation with State and municipal health authorities in the prevention of the spread of contagious and infectious diseases in interstate traffic, including the sanitation of areas adjoining military and naval reservations and Government industrial plants, in order properly to safeguard the health of the military forces and Government employees, \$1,000,000.

The activities may be enumerated as follows: Malaria control, rural sanitation, control of milk supplies, control of food supplies,

medical inspection of schools, public-health nursing, control of communicable diseases, and general sanitation.

To carry out extra-cantonment zone work and the disease-control measures as outlined above, service supervision was maintained in 51 zones, 13 of these having complete organizations, which were given every assistance by service officials on duty. The results of these organizations demonstrated so clearly the advantages to be derived from a completely organized and well-equipped health department that when service activities were concluded, 21 towns and cities in which the service had been operating created and made provision for complete organizations with full-time health officials.

Under the supervision of the Division of Sanitary Reports and Statistics, the service published each week a summary of the prevalence of the more important communicable diseases in the extra-cantonment zones. Officers of the service forwarded over 40,000 completed cards reporting communicable diseases. These cards, when tabulated as to disease, age, sex, color, and termination of illness, should be of value to sanitarians in their study of preventable diseases.

Prevention of interstate spread of disease.—In view of the fact that the Public Health Service is obligated by congressional action to prevent the interstate spread of disease, a plan was discussed at the recent meeting of the State and Territorial health officers in Washington, whereby service officers should be detailed to the different States at the request of the State health officer for the purpose of assisting in the control of the interstate spread of disease. It was decided that assistance could be more efficiently rendered by having a service officer on duty in the individual State health department in order to be able to keep the bureau more closely in touch with the incidence of disease in the respective localities. As a result of this plan an officer has been assigned to this duty in each of the following States where he is available for epidemiological work in order better to assist in the prevention of the interstate spread of disease.

Arkansas.

Georgia.

Louisiana.

Maryland.

Massachusetts.

Indiana.

Ohio.

South Carolina.

Wisconsin.

Mississippi.

The influenza epidemic.—During the summer of 1918 there appeared press reports of an epidemic of so-called "Spanish influenza," which was practically pandemic in southern Europe. The disease was reported to the Public Health Service from France, Switzerland, Great Britain, and elsewhere. Press dispatches reported about 8,000,000 persons suffering from the disease in Spain alone. During April and May, 1918, prior to the report of influenza in epidemic form in the United States, several outbreaks of disease of unknown origin were

reported and were investigated by officers of this service, with the conclusion that it was influenza in a mild form.

The first report to the Surgeon General of any considerable number of known cases in this country was received from Boston, Mass., on September 18, 1918, stating that 2,500 cases existed in that vicinity. On September 24 an officer was detailed to Boston to investigate conditions and obtain whatever information was possible. On September 28 the State health authorities of Massachusetts requested assistance from the bureau in combating what was then an epidemic of serious proportions. An officer of the service was immediately sent to Boston to supervise service activities in cooperation with the different State health departments in the New England States, and within the next few days about 20 service officers had been detailed there.

The disease spread rapidly throughout the country and soon became pandemic. Owing to the inability of States, cities, and localities to furnish medical assistance and nursing supervision to those suffering from the disease, Congress on October 1, 1918, appropriated \$1,000,000 for use in combating the epidemic.

Service officers were detailed to different sections to cooperate with local agencies and to give all possible assistance to afflicted communities. All marine and other hospitals under the direction of the service were opened to patients suffering from the disease. State health officers were made field directors in many instances, as the number of service officers was inadequate. The entire force engaged in extra-cantonment work was employed in the battle with the disease.

The American Medical Association and the Volunteer Medical Service Corps were called upon to furnish medical assistance and the American Red Cross to furnish nurses. This resulted in the employment of about 1,100 doctors and 800 nurses and nursing assistants who were available for duty wherever needed. In addition hundreds of doctors and thousands of nurses and nursing assistants volunteered for service in their own localities. The personnel in the employ of the Public Health Service was shifted about and transferred from State to State as the epidemic lessened in one area and became violent in another.

There was a great dearth of doctors and nurses owing to the demands of the war, and the personnel under the direction of the Public Health rendered splendid service in relieving the distress of many stricken communities. Nurses and physicians also were detailed for duty on various Indian Reservations and in the Territory of Alaska.

The Division of Sanitary Reports and Statistics cooperated in the work. To obtain prompt and adequate information as to the prevalence of the disease throughout the country, all State health officers

were requested to collect reports from municipal and local health authorities, and to send a daily summary to the bureau. These reports were compiled and furnished to those interested in the suppression of the epidemic.

A bulletin of advice was published giving the known facts regarding the disease, its mode of spread, and the precautions which should be observed. Millions of copies of this bulletin were distributed. Press bulletins were sent out through the large newspaper associations, and a series of one-column newspaper articles were supplied in the form of stereotyped plates and matrices to more than 10,000 newspapers. A poster bearing an instructive cartoon calling attention to the necessity for covering coughs and sneezes was displayed in post offices, railroad stations, stores, schools, and on bulletin boards.

The epidemic reached its height during the months of October and November and gradually diminished until in February, 1919, the bureau felt that local physicians were able to meet the demands for medical assistance. Consequently on February 15 virtually all personnel were recalled and all service work discontinued.

Division of Foreign and Insular Quarantine and Immigration.

The operations of the Public Health Service with reference to the administration of quarantine stations and enforcement of quarantine laws and regulations were conducted on the same general lines as formerly. During the year service officers inspected 11,424 vessels and 731,065 passengers and crew at maritime stations. At border quarantine stations 70,171 travelers were inspected, exclusive of the local interurban traffic. There were detained 1,807 vessels, either because of disease on board or because the vessel came from an infected port, and 1,721 vessels were disinfected.

At foreign and insular stations Public Health Service officers inspected 4,245 vessels, 344,326 passengers and crew, and fumigated 1,396 vessels.

During the year the legislature of the State of Texas enacted a law providing for the transfer of certain State quarantine stations, property and functions to the Public Health Service, contingent upon reimbursement to the State of Texas for the property transferred. In accordance with the terms of that measure, negotiations for the transfer were initiated and were progressing at the end of the fiscal year. The chief result of this action will be the elimination of the double quarantine system at Galveston and several points along the Texas-Mexican border and the acquisition of control by the Public Health Service of minor stations along the Gulf at Sabine Pass, Aransas Pass, and Point Isabel. Along the border, quarantine administration will remain as formerly, except that the State will

abandon its function and the Public Health Service will have sole control.

In the latter part of the fiscal year, the governor of the State of Pennsylvania by proclamation suspended the State quarantine service at Delaware River, and plans were perfected whereby the department would take over the Marcus Hook quarantine station under the terms of a lease, at a nominal rental, and conduct quarantine inspection at Delaware River from that place. Inspection of vessels at Reedy Island quarantine station will be discontinued and that station held in reserve for the treatment of infected vessels and the disinfection and detention of passengers and crew as required. By this arrangement there was eliminated a double quarantine system that was most expensive and inconvenient to the commercial interests of Philadelphia.

Baltimore quarantine station continued to be operated by the Public Health Service under the terms of the lease between the Government and the city. The department had hoped that the necessary appropriations would be granted to enable the service to take over both the Baltimore and the New York stations, thus completing the national quarantine system. Favorable action, however, was withheld by Congress.

It has been the established policy of the Government since 1893 to take over local quarantine stations, paying for them at reasonable prices, and operating them under Federal control. Under the general provisions of the act of February 15, 1893, virtually all of the local and State quarantine stations thus have been transferred to the United States Government, the exceptions being Baltimore and New York. The transfer of those two stations is merely being held in abeyance pending the necessary appropriations by Congress.

There were 19 officers of the Public Health Service on duty at American consulates for the purpose of enforcing the provisions of the United States quarantine regulations affecting vessels at the port of departure. These officers also examined intending immigrants for the purpose of determining whether they were eligible physically and mentally for admission to the United States.

The prevalence of plague, yellow fever, cholera, typhus, and small-pox in countries having commercial relations with the United States continued as in the previous year, but the measures carried out by the Public Health Service at foreign and domestic ports have prevented the introduction of any of these maladies.

The operation of the quarantine stations along the Mexican border was so successful that no cases of typhus were reported as occurring in the southwestern part of the United States, notwithstanding a very considerable prevalence of the disease in northern and central Mexico.

An epidemic of typhus of some dimension was reported at Rotterdam, and a public health officer was stationed at that place to carry out precautionary measures against vessels, crews, and passengers destined for the United States. Typhus was also reported as very prevalent in certain of the Italian coast cities, and medical officers of the Public Health Service likewise were assigned to those places to supervise precautionary measures against vessels sailing for the United States. The dissemination of typhus throughout Europe was expected to occur on the cessation of hostilities, and, for the purpose of meeting such an emergency, a medical officer of the Public Health Service was ordered to Europe as general supervisor of service activities in that section. It is a striking testimonial to the sanitary measures carried out among the troops and at embarkation camps that no case of typhus developed on any of the transports returning from Europe or among the crews or passengers of merchant vessels.

Cholera prevailed chiefly in the Orient, where, in the latter part of the fiscal year, it reached grave epidemic proportions, principally in the Philippines and along the Chinese coast. The chief quarantine officer of the Philippines is carrying out all necessary precautionary measures against the spread of the disease to vessels at Manila, thus eliminating danger of the disease being transported to the United States.

Plague prevailed in about the same areas as in the preceding year, but India continues to be the chief reservoir of the infection for the rest of the world.

There was the usual infection reported from Guayaquil, where the disease remains a constant menace to the Canal Zone.

The only measure that seems to promise the successful exclusion of plague from our ports is the systematic fumigation of all vessels for the destruction of rats, and for this purpose 3,117 vessels were fumigated during the year.

Yellow fever again was reported as occurring in epidemic form in Merida, Yucatan Peninsula, Mexico. In the latter part of the fiscal year a severe epidemic was reported in the northern part of Peru, the disease having been introduced from Guayaquil. On the eastern coast of South America a notable epidemic of the disease occurred in the city of Bahia.

While the source of infection at Guayaquil is a constant menace to the Canal Zone, the foci in South America do not constitute any serious menace to the United States. It is the foci in Mexico that constitute the menace to this country.

Smallpox of a very virulent type continued present in Mexico. On account of the aversion of the mass of the population to vaccination, it is not expected that the smallpox situation in Mexico will improve materially for many years to come. For the purpose of preventing

the introduction of infection into the United States chief reliance was placed on vaccination of incoming travelers. In the course of the year 41,376 persons were vaccinated at border points.

Medical inspection of aliens.—During the fiscal year ended June 30, 1919, officers of the Public Health Service examined 926,234 aliens for the purpose of detecting such mental or physical conditions as might render them subject to deportation under the provisions of the immigration law. Of this total 339,375 were passengers, and 586,859 were alien seamen. Of the total number of aliens examined, 19,149 were certified to by Public Health officers as having some mental or physical defect. The disabilities discovered that would render the alien mandatorily subject to deportation were 623 on account of mental defects and 4,530 on account of disease. Nine thousand nine hundred and seventy-one aliens were certified to as having some physical condition that would materially interfere with their ability to earn a living, and 4,025 were certified to as having some minor physical defect.

While the European conditions during the past year were such as materially to curtail immigration, the provisions of the immigration act of February 5, 1917, with reference to the medical examination of alien seamen served to make the magnitude of medical examinations almost on a parity with the prewar period, especially at the port of New York.

Division of Sanitary Reports and Statistics.

Industrial morbidity reports.—To collect industrial morbidity reports, the service has prepared a blank form to be suggested to all industrial establishments which will agree to inaugurate the keeping of records and supply the same to the Public Health Service. These records will be published in the Public Health Reports regularly.

Collaborating epidemiologists, assistant collaborating epidemiologists, and epidemiologic aides.—To assist the States in the collection of more complete morbidity statistics, the service has continued its policy of appointing officials at nominal salaries in additional States and now has 485 collaborating and assistant collaborating epidemiologists. Pursuing this policy of aiding the States and thereby increasing the completeness of the morbidity reports of the service, the bureau has detailed regular officers as epidemiologic aides to eight States. It is intended that these regular officers shall do everything possible to encourage the physicians in their States to report promptly all of the important communicable diseases. If these details of epidemiologic aids prove satisfactory and add to the efficiency of morbidity reporting, it is contemplated detailing regular officers to every State desiring such cooperation.

State and city morbidity reports.—Weekly telegraphic reports of the prevalence of communicable diseases were received from State health officers and published currently in the Public Health Reports, 24 States reporting at the close of the year.

Thirty-nine States furnished monthly reports of the prevalence of preventable diseases, and annual summaries of the reported morbidity or mortality, or both, were received from 44 States.

At the end of the year, reports of the prevalence of communicable diseases from 475 cities in all parts of the United States were being received and published weekly in the Public Health Reports, an increase of 25 cities as compared with the previous fiscal year.

Public Health Reports.—During the fiscal year the weekly Public Health Reports contained 2,737 pages, or 464 more than during the preceding year. Sixty-four articles appearing in this publication were reprinted as separate pamphlets for economical distribution.

Division of Marine Hospitals and Relief.

During the fiscal year 93,722 patients received treatment as beneficiaries of the service. Of this number 38,355 were treated in hospitals, and 55,367 were treated as dispensary or out-patients. The hospital patients received a total of 757,018 days' treatment. Of the above patients 13,856 were beneficiaries of the Bureau of War Risk Insurance, and 6,465 were injured employees of the Government coming under the United States Employees' Compensation Commission, 11,454 being treated in hospital and 8,867 treated as dispensary or out-patients. During the year the service operated 21 marine hospitals, all of which are owned by the Government, and maintained 118 other relief stations where medical assistance was furnished patients.

In carrying out the provisions of the act of Congress approved March 3, 1919, entitled "An act to authorize the Secretary of the Treasury to provide hospital and sanatorium facilities for discharged sick and disabled soldiers, sailors, and marines," nine Public Health hospitals were established during the latter part of the year, chiefly in May and June. The majority of these hospitals were transferred to this service by the War Department under the provisions of the above-mentioned act.

At the tuberculosis sanatorium of the service at Fort Stanton, N. Mex., 600 patients were cared for during the year. Of these, 319 were discharged, 81 died at the sanatorium, and 200 remained under treatment at the close of the year.

Aid was extended to other branches of the Government in the physical examinations of 41,185 persons, of whom 3,593 were rejected. In addition, 10,306 merchant seamen were physically

examined to determine their fitness for service on American vessels, of whom 908 were rejected; and 1,749 foreign seamen were examined, of whom 80 were rejected. Nine thousand six hundred and sixteen beneficiaries of the War Risk Insurance Act were given physical examinations.

During the latter part of the year the Canadian Government requested the Secretary of the Treasury to extend to discharged Canadian soldiers resident in the United States the facilities of the hospitals of the Public Health Service under a reciprocal arrangement by which discharged American soldiers would receive the same privileges in Canada. In pursuance of this request plans were made whereby the Public Health Service will treat in its hospitals and contract hospitals all discharged Canadian soldiers resident in the United States, and Canada will do likewise with respect to discharged American soldiers.

Division of Venereal Diseases.

With the signing of the Army appropriation bill on July 9, 1918, the Division of Venereal Diseases was created as a part of the Public Health Service with an assistant surgeon general in charge. The act appropriated \$1,000,000 for allotment to States which should adopt the regulations for the control of venereal diseases promulgated by the Secretary of the Treasury.

The duties of the division under the law are to study and investigate the cause, treatment, and method of prevention of such diseases to cooperate with State boards of health; and to promulgate and enforce interstate quarantine regulations governing the travel of infected persons.

The program for carrying out the law has developed into three phases: The medical, the educational, and the law enforcement. The proper coordination of these three phases is deemed essential to the success of the program as a whole, but it has proved a problem most difficult of solution. It is believed, however, that progress has been made and that the results obtained indicate that a solution is being found.

Public-health education.

The importance of the educational activities of the Public Health Service was never better exemplified than during the nation-wide epidemic of influenza.

In order to extend and better coordinate this important educational work, a section of public health education was organized in April, 1919. In the short period the section has been in operation a number of promising features have been inaugurated, and there is reason to believe that the organization of this section will contribute greatly to the promoting of the public health.

The section aims to constitute itself a national center or clearing house on the subject of public health education. Plans are under way whereby all the ordinary media of publicity and education will be used. This will involve the preparation of press bulletins and the utilization of stereomats and plates, the publication of lithographed health posters, the organization of a lecture service, the administration of a loan library of stereopticon slides and moving pictures, the preparation and organization of traveling exhibits, the maintenance of a public health information bureau, and the employment of such other educational methods as the circumstances may indicate. It is planned to carry on these activities in close cooperation with State and local health authorities and with important national health organizations.

During the fiscal year 1919, the service issued more publications than in any other year since its creation. Exclusive of the publications of the Division of Venereal Diseases, the editions aggregated 9,532,392 copies, an increase of 5,167,542 over that reported last year. The publications of the Division of Venereal Diseases aggregated 10,120,772 copies. In the face of the country's large demand for the bureau's publications, the limited funds available for printing made it necessary to curtail the issue of a considerable number of health leaflets and entirely to forego reprinting some of the leaflets in foreign languages for use in industrial centers having a large foreign element.

Recommendations.

Personnel.—At the close of the fiscal year ended June 30, 1918 there were 218 medical officers in the regular commissioned corps. This number has decreased to 206, by deaths and resignations, in spite of strenuous and persistent efforts to augment the service by recruits in the entrance grade and notwithstanding the fact that Congress authorized by the act approved March 3, 1919, a large addition to the corps to enable it to care for the patients of the War Risk Insurance Bureau. Moreover, at this time the number is still further being reduced by additional resignations, and it is clear that something must be done to obtain and retain efficient medical officers for duty in the Public Health Service.

At present, the opportunities in private life are so much greater in the way of financial returns that it is practically impossible to obtain recruits in the grade of assistant surgeon, which is the only way provided in law.

The failure to increase is partly due to the fact that the pay in the lower grades is not commensurate with that received in private life and partly due to the fact that the prospect for promotion to the higher grades is uncertain.

In order to remove these handicaps to recruiting the service to the required number, the following legislation is respectfully recommended:

1. Provision for a substantial increase in the compensation for the commissioned corps.
2. Provision for the promotion of assistant surgeons to the grade of passed assistant surgeon, after three years' service, instead of four as at present.
3. Provision for an increase in the number of senior surgeons and assistant surgeons general.
4. In addition to the needs of improving the conditions of the regular commissioned medical corps, the development of the Public Health Service now requires the commissioning of men who represent branches of the sanitary profession other than medical. This matter is becoming more urgent as time goes on, and the passage of legislation is needed to permit commissioning in the Public Health Service, members of the sanitary profession, such as sanitary engineers, pharmacologists, zoologists, chemists and bacteriologists, after satisfactory examination.

National quarantine.—The recommendation of former years is renewed with respect to the acquisition of the New York and Baltimore quarantine stations, thus completing the national quarantine system.

The respective governments of the State of New York and the City of Baltimore have enacted the necessary legislation authorizing the transfer of these two properties to the United States Government subject to reimbursement being made in accordance with the valuation of the property being transferred. The Secretary of the Treasury is authorized to take over local quarantines in the act of February 15, 1893, and the lack of funds alone prevents the consummation of the transfer of these two stations to the Government. Recommendations repeatedly have been submitted to Congress for the necessary appropriations, but favorable action thus far has been withheld. The deferred action, however, appears to have been based more on questions of economy than policy, and the department trusts that there will be no reversal of the policy for national control of quarantine as expressed in the act of February 15, 1893, in accordance with which a very large number of local quarantines have been acquired by the United States Government and paid for according to the value of the property transferred.

Reports of prevalence of diseases.—It is again recommended that appropriations be increased in order that the present system may be extended and the reports made more complete. No health agency can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring. The

\$25,000 now appropriated for this purpose should be increased to \$100,000 for the next fiscal year. With adequate appropriations it will be possible to establish a registration area for morbidity reports and in time extend the area to cover most of the population of the United States.

Provision should be made for the issuance of a weekly mimeographed bulletin for immediate distribution to health officers giving information of the prevalence of communicable diseases in cities in different parts of the United States. The data for such a bulletin can be secured by telegraph from city health officers.

Division of Venereal Diseases.—The work of the Division of Venereal Diseases is of such great importance as a public health problem, and the details of a coordinated plan for the entire country are so varied, that increased personnel for this division is desired. At least \$320,000 is required for the proper operation of this division for the ensuing fiscal year.

COAST GUARD.

Award of life-saving medals.

Forty-one medals were awarded by the Secretary of the Treasury during the fiscal year ended June 30, 1919, under authority of acts of Congress approved June 20, 1874, June 18, 1878, May 4, 1882, and January 28, 1915, in recognition of heroism displayed upon thirty-four occasions in the rescue, or attempted rescue, of persons in danger of drowning in United States waters and from American vessels at sea. The medal of the first class (gold) was bestowed in five instances, and the medal of the second class (silver) in thirty-six instances. Twenty-four of the medalists were attached to the United States Navy; eight to the United States Army; two to the United States Marine Corps; two to the United States Coast Guard; three were police officers and two were civilians. Of those belonging to the Navy, five were officers and nineteen enlisted men. Of those belonging to the Army, two were officers and six enlisted men. The work of the medalists in twenty-three instances was performed within the boundaries of the United States; in five, at sea; in two, in France; in two, in the Dominican Republic; and in one, in Scotland. The number of persons rescued was thirty-seven; of whom twenty-eight were men, two women, and seven children.

LOANS AND CURRENCY.

The following is the report of the Division of Loans and Currency for the fiscal year ended June 30, 1919:

Interest-bearing debt of the United States—Changes during the fiscal year ended June 30, 1919.

Title of loan.	Rate.	Outstanding June 30, 1918.	Issued.	Retirements.	Outstanding June 30, 1919.
	<i>Per cent.</i>				
Consols of 1930.....	2	\$599,724,050.00	.....	.....	\$599,724,050.00
Loan of 1908-18.....	3	63,945,460.00	.....	\$63,009,460.00	¹ 936,000.00
Loan of 1925.....	4	118,489,900.00	.....	.....	118,489,900.00
Panama Canal loan:					
Series of 1916-36.....	2	48,954,180.00	.....	.....	48,954,180.00
Series of 1918-38.....	2	25,947,400.00	.....	.....	25,947,400.00
Series of 1961.....	3	50,000,000.00	.....	.....	50,000,000.00
Conversion bonds.....	3	28,894,500.00	.....	.....	28,894,500.00
One-year Treasury notes	3	19,150,000.00	.....	19,150,000.00	.....
Postal savings bonds— first to sixteenth series.	2½	11,060,700.00	\$289,260.00	.....	11,349,960.00
Certificates of indebted- ness:					
Various issues.....		1,725,009,500.00	16,776,604,890.00	15,046,532,900.00	² 3,455,081,490.00
2 per cent Pitman act	2	.....	178,723,000.00	.....	178,723,000.00
First Liberty loan					
bonds of 1932-47.....	3½	1,421,240,700.00	.....	³ 11,169,100.00	1,410,071,600.00
First Liberty loan con- verted bonds of 1932-47.	4	567,666,500.00	.....	⁴ 399,873,750.00	167,792,750.00
First Liberty loan con- verted bonds of 1932-47.	4½	.....	405,443,150.00	2,003,050.00	403,440,100.00
First Liberty loan sec- ond converted bonds of 1932-47.....	4½	.....	3,492,050.00	.....	3,492,050.00
Second Liberty loan					
bonds of 1927-42.....	4	3,746,724,600.00	89,600.00	3,042,609,850.00	704,204,350.00
Second Liberty loan					
converted bonds of 1927-42.....	4½	.....	3,034,609,850.00	172,357,600.00	2,862,252,250.00
Third Liberty loan					
bonds of 1928.....	4½	2,618,329,350.00	1,541,883,850.00	201,660,500.00	3,958,552,700.00
Fourth Liberty loan					
bonds of 1933-38.....	4½	.....	6,958,481,700.00	165,000,000.00	⁵ 6,793,481,700.00
Victory Liberty loan					
notes, 1922-23.....	4½ & 3½	.....	2,823,229,700.00	.....	⁶ 2,823,229,700.00
War Savings and thrift					
stamps, series 1918-19..	⁷ 4	⁸ 349,797,297.33	⁸ 738,247,741.07	⁸ 134,047,603.63	⁸ 953,997,434.77
Soldiers' and sailors' civil relief bonds.....	3½	.....	179,500.00	100.00	179,400.00
Total.....		11,394,934,137.33	32,461,274,291.07	19,257,413,913.63	24,598,794,514.77

¹ Interest ceased August 1, 1918.

² Includes \$8,821,000 on which interest has ceased.

³ Includes \$103,600 adjustment which was made subsequent to June 30, 1918.

⁴ Includes \$4,050 adjustment in amount issued—adjustment made subsequent to June 30, 1918.

⁵ Excludes \$1,022,887 full-paid subscriptions—bonds not delivered.

⁶ Actual deliveries of notes against full-paid subscriptions.

⁷ Thrift stamps do not bear interest.

⁸ Amount shown by Treasurer U. S. Amount outstanding June 30, 1918, not previously reported.

Interest on registered bonds and registered certificates of indebtedness.

Title of loan.	Checks issued.	
	Number.	Amount.
Consols of 1930.....	36,785	\$11,955,835.00
Loan of 1908-1918.....	19	(1)
Loan of 1925.....	15,670	4,156,704.00
Panama Canal loan:		
Series of 1916-1936.....	3,957	978,891.60
Series of 1918-1938.....	2,199	516,235.40
Series of 1961.....	7,902	1,300,296.75
Conversion bonds.....	431	197,107.50
One year Treasury notes.....	25	199,050.00
Soldiers' and sailors' civil relief bonds.....	204	4,130.00
Postal savings bonds.....	17,280	265,199.75
Certificates of indebtedness (2 per cent Pitman).....	14	364,529.24
Liberty loans:		
First Liberty loan 3½ per cent.....	74,470	9,615,095.00
First Liberty loan converted 4 per cent.....	115,776	1,277,217.00
First Liberty loan converted 4½ per cent.....	167,815	3,053,204.24
First Liberty loan second converted 4½ per cent.....	1,618	23,607.10
Second Liberty loan 4 per cent.....	484,321	7,795,717.00
Second Liberty loan converted 4½ per cent.....	464,123	14,231,334.50
Third Liberty loan 4½ per cent.....	1,325,724	16,735,535.04
Fourth Liberty loan 4½ per cent.....	1,203,098	16,203,055.95
Total.....	3,921,431	88,872,744.17

¹ Duplicates.

Insular and District of Columbia loans—Changes during year.

Title of loan.	Rate.	Outstand- ing June 30, 1918.	Issues.	Retire- ments.	Outstand- ing June 30, 1919.
Philippine:	<i>Per ct.</i>				
Land purchase loan of 1914-1934.....	4	\$7,000,000			\$7,000,000
Public improvement loans—					
First series, 1915-1935.....	4	2,500,000			2,500,000
Second series, 1916-1936.....	4	1,000,000			1,000,000
Third series, 1919-1939.....	4	1,500,000			1,500,000
Philippine loan of 1916 (1926-1946).....		4,000,000			4,000,000
City of Manila sewer and water bonds—					
First series, 1915-1935.....	4	1,000,000			1,000,000
Second series, 1917-1937.....	4	2,000,000			2,000,000
Third series, 1918-1938.....	4	1,000,000			1,000,000
Philippine certificates of indebtedness—					
Coupon Apr. 1, 1919.....			\$10,000,000		10,000,000
City of Cebu loan of 1921-1941.....	4	125,000			125,000
Total Philippine.....		20,125,000	10,000,000		30,125,000
Porto Rico:					
Road loan 1910-1920-1927.....	4	425,000			425,000
San Juan Harbor improvement loans—					
Series 1912-1922-1937.....	4	100,000			100,000
Series 1914-1924-1939.....	4	200,000			200,000
Series 1915-1925-1940.....	4	200,000			200,000
Series 1917-1942.....	4	100,000			100,000
Irrigation loans—					
Series 1913-1933-1943.....	4	1,000,000			1,000,000
Series 1913-1933.....	4	700,000			700,000
Series 1914-1951.....	4	400,000			400,000
Series 1915-1955-1958.....	4	400,000			400,000
Public improvements—					
Series 1914-1925-1939.....	4	1,000,000			1,000,000
Series 1916.....	4	500,000			500,000
Refunding loans—					
Series 1914-1923 etc.....	4	655,000			655,000
Series 1915-1919-1935.....	4	300,000			300,000
Municipal third series.....	4	300,000			300,000
Total Porto Rico.....		6,280,000			6,280,000
District of Columbia:					
50-year funded loan of 1924.....	3.65	5,581,300		\$7,300	5,574,000

Circulation.

The amounts of the several kinds of money in circulation in the United States on the 1st day of each month during the year are shown in the following table, in millions of dollars:

Money in circulation, 1918-19.

(In millions of dollars.)

Kind.	1918, on 1st day of—						1919, on 1st day of—						
	July. ¹	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July. ¹
Gold coin.....	1,114	1,168	1,062	962	945	937	910	939	984	1,090	1,106	1,100	1,112
Gold certificates.....	818	805	754	740	724	705	662	642	630	601	589	580	530
Standard silver dollars.....	77	78	79	81	81	82	83	87	81	81	81	81	80
Silver certificates.....	379	361	344	330	315	294	264	233	216	207	195	179	169
Treasury notes of 1890.....	1	1	1	1	1	1	1	1	1	1	1	1	1
Subsidiary silver.....	216	218	221	226	231	234	237	233	231	230	231	231	231
United States notes.....	340	340	340	338	339	337	337	335	333	330	331	334	332
Federal reserve notes.....	1,713	1,869	2,090	2,365	2,531	2,607	2,630	2,443	2,475	2,503	2,520	2,506	2,494
Federal reserve bank notes.....	15	15	24	42	70	95	125	135	136	142	152	155	163
National bank notes.....	703	700	701	700	701	697	696	673	661	657	653	662	649
	5,379	5,559	5,621	5,790	5,943	5,993	5,951	5,726	5,753	5,847	5,863	5,834	5,766
Per capita (in dollars)	50.8	52.4	52.9	54.4	55.8	56.2	55.7	53.5	53.7	54.5	54.6	54.2	51.3

¹ Revised figures.

The increases and decreases in the amounts of the several kinds of money in circulation between July 1, 1918, and July 1, 1919, are shown in the following table:

Comparative statement showing the changes in circulation.

	In circulation—		Decrease.	Increase.
	July 1, 1918.	July 1, 1919.		
Gold coin.....	\$1,114,077,426	\$1,112,353,324	\$1,724,102	.....
Standard silver dollars.....	77,525,527	80,751,524	.....	\$3,228,997
Subsidiary silver.....	216,978,302	231,886,499	.....	14,908,197
Gold certificates.....	818,353,349	530,362,211	287,991,138	.....
Silver certificates.....	379,211,468	169,148,295	210,063,173	.....
Treasury notes, act of July 14, 1890.....	1,851,114	1,745,161	105,953	.....
United States notes.....	340,042,812	332,862,551	7,180,261	.....
Federal reserve notes.....	1,713,074,255	2,494,029,937	.....	780,955,682
Federal reserve bank notes.....	15,257,105	163,245,730	.....	147,988,625
National bank notes.....	703,056,066	649,641,741	53,414,325	.....
Total.....	5,379,427,424	5,766,029,973	560,478,952	947,081,501
Net increase.....	.....	.....	.....	386,602,549

Paper custody.

Kind.	On hand July 1, 1918.	Received from con- tractors.	Issued to bureau.	On hand June 30, 1919.
Distinctive paper for United States securities, Federal reserve notes, Federal reserve, and national-bank currency.....	<i>Sheets.</i> 19,107,619	<i>Sheets.</i> 205,000,030	<i>Sheets.</i> 195,092,465	<i>Sheets.</i> 29,615,184
Internal-revenue paper.....	13,363,000	75,760,000	70,418,300	18,701,700
Postage-stamp paper.....	4,276,012	40,556,090	39,655,022	5,177,080
Check paper.....	241,331	7,791,780	4,006,579	4,029,532
United States bond paper.....	3,539,129	30,003,221	20,748,956	12,793,394
Parchment, artificial parchment, and parch- ment deed paper.....	143,533	112,541	124,514	131,560
Postal savings cards.....	156,126			156,126
Customs-stamp paper.....	131,459	200,000	322,344	9,115
Miscellaneous papers.....	515,401	2,869,403	2,220,517	1,164,287
Philippine Islands paper: Distinctive paper for silver certificates, national-bank and Treasury notes.....	1,101,192	3,175,636	3,075,200	1,201,628
Postage-stamp paper.....	20,498	122,077	43,077	99,498
Internal-revenue and check paper.....	46,110			46,110
Total.....	42,641,410	366,193,778	335,706,974	73,128,214
Rolls postage-stamp paper.....	434	1,149	1,351	232
Rolls internal-revenue paper.....	595	434	467	562
Rolls United States security paper.....		54	23	31

Custody of Federal reserve notes, series of 1914 and 1918.

Federal reserve bank.	On hand July 1, 1918.	Received.	Issued.	On hand June 30, 1919.
Boston.....	\$69,020,000	\$234,540,000	\$182,920,000	\$120,640,000
New York.....	259,000,000	680,260,000	664,900,000	283,960,000
Philadelphia.....	33,020,000	233,420,000	188,710,000	79,700,000
Cleveland.....	39,800,000	181,340,000	147,800,000	73,340,000
Richmond.....	31,040,000	173,500,000	113,300,000	94,300,000
Atlanta.....	68,720,000	161,660,000	147,300,000	83,080,000
Chicago.....	91,880,000	393,640,000	291,080,000	197,440,000
St. Louis.....	16,110,000	167,400,000	117,400,000	66,140,000
Minneapolis.....	23,940,000	80,960,000	58,400,000	46,500,000
Kansas City.....	46,620,000	90,740,000	61,000,000	76,360,000
Dallas.....	21,300,000	105,960,000	35,800,000	91,400,000
San Francisco.....	5,220,000	197,860,000	189,500,000	13,080,000
Total.....	714,300,000	2,709,840,000	2,198,200,000	1,225,940,000

*Audit and destruction of retired currency, thrift cards, and war savings stamps.**Statement of redeemed securities handled, accounted for, and destroyed during the fiscal year 1919.*

Description.	Subjects.	Face value.
REDEMPTIONS.		
United States currency.....	311,225,199	\$731,404,816.00
Compound-interest notes.....	13	220.00
Refunding certificates.....	50	500.00
Federal reserve notes (redeemed by Federal reserve agents).....	1,654,800	12,822,000.00
Federal reserve notes (redeemed by Treasurer United States) ¹	91,881,333½	864,495,935.00
Federal reserve currency ¹	19,874,373	31,771,820.00
National-bank currency (5 per cent redemption fund) ¹	26,917,528½	256,875,612.50
National-bank currency (retired) ¹	2,297,930½	22,835,072.50
National-bank currency (unissued) ¹	1,110,578	14,471,270.00
War savings certificate stamps.....	69,627,307	348,136,535.00
Thrift cards.....	20,380,035	81,520,140.00
Federal farm loan bonds ¹	13,452	10,794,670.88
Federal farm loan interim certificates ¹	19,942,000	100,149,150.00
Internal-revenue stamps ¹	(2)	50,902,926.10
Total.....	564,924,599½	2,526,183,667.98

¹ Not counted by Division of Loans and Currency; all other items counted by Division of Loans and Currency.² Not available.

Liberty bonds and Victory notes.

War loan securities account—Deliveries from vault, retirements, and outstanding from April 6, 1917, to June 30, 1919.

	Delivered.		Retired.	
	Number of pieces.	Face amount.	Number of pieces.	Face amount.
First Liberty loan:				
Part-paid interim certificates.....	2,728,500	\$2,829,200,000	2,728,454	\$2,829,199,245
Full-paid interim certificates.....	5,676,950	4,130,200,000	5,662,643	4,124,183,050
First 3½ per cent coupon bonds.....	4,790,937	1,444,786,250	1,804,729	311,743,350
First 3½ per cent registered bonds.....	113,398	350,292,200	29,185	62,074,600
First converted 4 per cent coupon bonds.	3,933,676	615,506,350	2,486,195	463,647,200
First converted 4 per cent registered bonds.....	162,841	78,474,500	87,785	57,418,550
First converted 4½ per cent coupon bonds.....	2,386,438	556,494,900	566,933	135,426,700
First converted 4½ per cent registered bonds.....	195,684	112,527,900	37,461	23,527,850
First second converted 4½ per cent coupon bonds.....	34,827	10,603,200	21,101	7,223,850
First second converted 4½ per cent registered bonds.....	3,117	2,545,000	113	77,800
Second Liberty loan:				
Second 4 per cent coupon bonds.....	15,249,507	3,836,714,750	9,826,375	3,205,246,300
Second 4 per cent registered bonds.....	564,245	431,191,750	281,993	345,288,450
Second converted 4½ per cent coupon bonds.....	8,569,020	3,094,813,550	1,535,043	428,279,350
Second converted 4½ per cent registered bonds.....	547,507	523,203,150	66,475	79,681,650
Third Liberty loan:				
Third 4½ per cent coupon bonds.....	24,845,118	4,314,049,100	5,259,689	850,699,850
Third 4½ per cent registered bonds.....	1,227,263	582,883,300	84,060	41,388,600
Fourth Liberty loan:				
Fourth 4½ per cent coupon bonds.....	33,006,754	6,893,142,850	5,530,964	895,962,650
Fourth 4½ per cent registered bonds.....	2,100,926	1,049,016,350	89,958	169,397,800
Victory Liberty loan:				
4½ per cent coupon Victory notes.....	13,905,217	3,080,380,800	10,431	3,692,000
4½ per cent registered Victory notes.....	266,997	144,605,800	1,696	1,029,150
3 per cent coupon Victory notes.....	482,791	710,942,000	148	605,000
3½ per cent registered Victory notes.....	1,844	17,381,500		
Total Liberty bonds and Victory notes.....	120,793,557	34,808,955,200	36,111,421	14,035,792,995

	On hand at Federal reserve banks and replacement stock.		Outstanding.	
	Number of pieces.	Face amount.	Number of pieces.	Face amount.
First Liberty loan:				
Part-paid interim certificates.....			46	\$755
Full-paid interim certificates.....			14,307	6,016,950
First 3½ per cent coupon bonds.....	69,720	\$13,671,350	2,916,488	1,119,371,550
First 3½ per cent registered bonds.....			84,213	288,217,600
First converted 4 per cent coupon bonds.	35,276	5,139,650	1,412,205	146,719,500
First converted 4 per cent registered bonds.....			75,056	21,055,950
First converted 4½ per cent coupon bonds.....	410,522	104,423,300	1,408,983	316,644,900
First converted 4½ per cent registered bonds.....	1,110	3,479,850	157,113	85,520,200
First second converted 4½ per cent coupon bonds.....	2,624	1,000,000	11,102	2,379,350
First second converted 4½ per cent registered bonds.....	403	1,354,500	2,601	1,112,700
Second Liberty loan:				
Second 4 per cent coupon bonds.....	86,312	13,266,200	5,336,820	618,202,250
Second 4 per cent registered bonds.....	1	500	232,251	85,902,800
Second converted 4½ per cent coupon bonds.....	869,649	250,261,550	6,164,328	2,416,272,650
Second converted 4½ per cent registered bonds.....	1,172	3,863,050	479,860	439,658,450
Third Liberty loan:				
Third 4½ per cent coupon bonds.....	286,220	35,592,500	19,299,209	3,427,756,750
Third 4½ per cent registered bonds.....	3,719	11,509,250	1,139,494	529,985,450
Fourth Liberty loan:				
Fourth 4½ per cent coupon bonds.....	582,595	64,997,900	26,893,195	5,932,182,300
Fourth 4½ per cent registered bonds.....	3,120	22,987,150	2,007,848	866,631,400

War loan securities account—Deliveries from vault, retirements, and outstanding from April 6, 1917, to June 30, 1919—Continued.

	On hand at Federal reserve banks and replacement stock.		Outstanding.	
	Number of pieces.	Face amount.	Number of pieces.	Face amount.
Victory Liberty loan:				
4½ per cent coupon Victory notes.....	3,546,371	\$839,189,050	10,348,415	\$2,237,499,750
4½ per cent registered Victory notes.....	3,804	21,670,850	261,497	121,905,800
3½ per cent coupon Victory notes.....	217,180	313,580,000	265,463	396,757,000
3½ per cent registered Victory notes....	700	9,165,000	1,144	8,216,500
Total Liberty bonds and Victory notes.....	6,120,498	1,715,151,650	78,561,638	19,058,010,555
Adjustments and issues pending June 30, 1919, net.....			149,065	68,506,645
Outstanding public debt items, June 30, 1919.....			78,710,703	19,126,517,200

¹ Approximately 12,000 pieces full-paid interim certificates outstanding against which bonds may be delivered, not included.

² Includes \$1,723,359 face amount, full-paid interim certificates outstanding against which bonds may be delivered.

Consolidated report, war loan registered issues, and interest payments.

Registered bonds and notes.	April 6, 1917, to June 30, 1919.			Fiscal year 1919.		
	Number of pieces.	Face amount.	Number of accounts.	Number of pieces.	Face amount.	Number of accounts.
Issues:						
On original subscriptions.....	3,526,260	\$1,715,858,750.00	2,168,856	2,954,052	\$1,111,484,650.00	1,819,859
Upon conversions.....	724,130	556,429,300.00	298,879	584,567	488,377,500.00	212,769
Upon coupon exchange.....	620,577	570,142,550.00	309,041	539,915	478,803,050.00	309,041
Upon transfer.....	53,729	52,133,350.00	43,742	48,474	43,461,250.00	51,240
	4,924,696	2,894,563,950.00	2,820,518	4,127,008	2,122,126,450.00	2,392,909
Retirements:						
Upon transfer.....	81,473	54,800,100.00	82,067	75,748	46,192,100.00	75,118
Upon registered exchange.....	135,284	105,038,650.00	172,010	125,023	76,115,100.00	157,510
Upon conversion.....	381,118	370,661,450.00	163,347	380,118	365,955,950.00	162,447
	597,875	530,500,200.00	417,424	580,889	488,263,150.00	395,075
Checks for interest issued..	4,384,687	87,412,333.50		3,836,270	68,934,764.93	
Addressograph operations:						
Registered bonds inscribed.....	4,898,418			4,127,008		
Interest checks inscribed.....	4,309,467			3,836,270		
Plates embossed for registered accounts.....	2,783,620			2,392,909		
Plates embossed for mailing list.....	300,000			300,000		
Account cards, interest cards, index cards, etc., inscribed.....	8,591,738			7,178,727		
Impressions of plate proof.....	8,350,860			7,178,727		
Changes in plates.....	79,508			60,508		
Accounts closed.....	417,424			395,075		
Plates assorted.....	4,400,894			2,392,909		
Plates reframed.....	952,000			952,000		
Duplicate interest schedules.....	60,000			40,000		
Total all items.....	35,143,929			28,854,133		
Corrections, new securities issued.....	40,558	\$4,181,320.00		30,000	50,494,200.00	
iscrepancies adjusted.....	40,000			35,000		

Coupon securities issued upon exchanges—Treasury cases.

[Fiscal year 1919.]

Loan title.	Denominational exchanges.			Registered exchanges.			Conversions.		
	Number of cases.	Number of bonds.	Amount of bonds.	Number of cases.	Number of bonds.	Amount of bonds.	Number of cases.	Number of bonds.	Amount of bonds.
First 3½'s.....	109	923	\$269,900	1,440	20,005	\$16,311,300			
First 4's.....	66	712	74,000	1,372	3,663	1,380,200			
First 4½'s.....	35	244	82,550	910	2,638	1,351,950	6,122	21,819	\$4,580,400
First second 4½'s.....	4	15	2,300	17	22	3,000	28	156	19,800
Second 4's.....	148	2,887	3,333,800	5,439	20,987	13,952,300			
Second 4½'s.....	122	63,502	4,911,200	2,432	21,450	18,093,400	10,136	84,255	28,076,400
Third 4½'s.....	504	29,739	2,805,600	11,100	51,250	15,937,250			
Fourth 4½'s.....	280	45,484	5,192,850	8,661	29,423	7,296,050			
4½% Victory notes..	1	1	100						
	1,269	143,507	16,672,300	31,371	149,438	74,325,450	16,286	106,230	32,676,600

Coupon bonds and notes retired upon exchange for registered issues, 1,101,102 pieces, amounting to \$495,115,550.

Claims on account of lost, stolen, or destroyed interest-bearing securities.

	Fiscal year 1918.	Fiscal year 1919.
Registered:		
Liberty issues—		
Number claimants.....	79	1,347
Number bonds.....	113	2,206
Amount involved.....	\$63,500.00	\$594,650.00
Number bonds reported recovered.....	19	266
Amount thereof.....	\$7,100.00	\$81,750.00
Other issues—		
Number claimants.....	43	56
Number bonds.....	89	133
Amount involved.....	\$119,080.00	\$46,620.00
Number bonds reported recovered.....	22	18
Amount thereof.....	\$53,720.00	\$2,520.00
Coupon:		
Liberty issues—		
Number claimants.....	773	5,256
Number bonds.....	2,250	14,216
Amount involved.....	\$377,750.00	\$1,977,650.00
Number bonds reported recovered.....	117	537
Amount thereof.....	\$48,600.00	\$117,850.00
Other issues—		
Number claimants.....	5	4
Number bonds.....	15	13
Amount involved.....	\$7,400.00	\$2,200.00
Certificates of indebtedness:		
Number claimants.....	20	37
Number certificates.....	42	87
Amount involved.....	\$129,300.00	\$221,000.00
Number certificates reported recovered.....	26	17
Amount thereof.....	\$68,500.00	\$68,000.00
War savings certificates and thrift stamps:		
Number claimants.....	52	3,128
Amount involved (maturity value).....	\$5,119.25	\$264,678.50
Number claims account deceased owners.....		5,453

War loan securities audit account, Apr. 6, 1917, to June 30, 1919.

	Received in vault.		Delivered to register.		Delivered to destruction committee.	
	Number of pieces.	Face amount.	Number of pieces.	Face amount.	Number of pieces.	Face amount.
CANCELED SECURITIES AUDIT.						
Liberty bonds and Victory notes:						
First 3½'s.....	1,416,423	\$163,506,800	1,124,733	\$130,807,300	66,932	\$12,604,350
First 4's.....	2,233,304	408,194,700	1,706,886	289,004,050	202,286	66,655,650
First 4½'s.....	470,215	120,192,550	30,282	2,725,100	353,667	104,641,250
First second 4½'s.....	8,354	1,756,050			170	38,550
Second 4's.....	8,714,014	2,714,463,900	6,260,590	1,895,554,450	53,929	25,916,400
Second 4½'s.....	1,151,782	186,380,050	185,695	24,442,900	593,733	116,666,150
Third 4½'s.....	3,491,293	303,076,850	1,037,474	88,031,850	117,472	50,437,000
Fourth 4½'s.....	4,183,484	423,373,250	843,952	75,921,550	697,417	132,327,050
4½ per cent Victory notes.....	7,655	3,651,100				
Miscellaneous.....	573,049	581,936,500	557,622	566,936,500		
Total Liberty bonds and Victory notes.....	22,249,573	4,906,531,750	11,747,234	3,073,426,700	2,085,606	509,286,400
Matured coupons from unissued bonds.....		44,156,603				21,019,890
20 per cent paid interim certificates.....	1,186,814	419,879,480				
40 per cent paid interim certificates.....	801,616	499,239,800				
70 per cent paid interim certificates.....	157,909	393,347,465				
Full-paid interim certificates.....	5,513,348	3,607,136,400				
Total interim certificates.....	7,659,687	4,919,803,145				
Certificates of indebtedness.....	534,129	1,907,373,500			534,129	1,907,373,500
Filled thrift cards.....	27,731,851	110,927,404			27,731,851	110,927,404
War savings certificate stamps, series 1918.....	69,627,307	348,136,535			69,627,307	348,136,535
PAID SECURITIES AUDIT.						
Certificates of indebtedness.....	2,047,233	19,082,974,000	2,047,233	19,082,974,000		
Liberty bonds retired.....	44,593	45,726,150	30,044	30,621,700		
War savings certificates.....	260,592	8,904,176				
	Restored to stock.		Audited on hand.		Unaudited on hand.	
	Number of pieces.	Face amount.	Number of pieces.	Face amount.	Number of pieces.	Face amount.
CANCELED SECURITIES AUDIT.						
Liberty bonds and Victory notes:						
First 3½'s.....	33,750	\$4,750,000	81,766	\$7,847,700	109,242	\$7,497,450
First 4's.....	644	750,000	222,841	38,041,550	100,647	13,743,450
First 4½'s.....			57,533	4,126,200	28,733	8,700,000
First second 4½'s.....			8,184	1,717,500		
Second 4's.....	47,509	12,525,450	1,462,858	565,689,250	889,128	214,778,350
Second 4½'s.....			178,221	20,325,000	194,133	24,946,000
Third 4½'s.....			671,041	45,840,000	1,665,306	118,765,000
Fourth 4½'s.....	150,000	15,000,000	692,828	60,377,650	1,799,287	139,747,000
4½ per cent Victory notes.....	7,655	3,651,100				
Miscellaneous.....			15,427	15,000,000		
Total Liberty bonds and Victory notes.....	239,558	36,676,550	3,390,699	758,964,850	4,786,476	528,177,250
Matured coupons from unissued bonds.....				15,635,762		7,500,951
20 per cent paid interim certificates.....			1,186,814	419,879,480		
40 per cent paid interim certificates.....			801,616	499,239,800		

War loan securities audit account, Apr. 6, 1917, to June 30, 1919—Continued.

	Restored to stock.		Audited on hand.		Unaudited on hand.	
	Number of pieces.	Face amount.	Number of pieces.	Face amount.	Number of pieces.	Face amount.
CANCELED SECURITIES AUDIT—continued.						
70 per cent paid interim certificates.....			157,909	\$393,347,465		
Full-paid interim certificates.....			5,513,348	3,607,136,400		
Total interim certificates.....			7,659,687	4,919,603,145		
Certificates of indebtedness.....						
Filled thrift cards.....						
War savings certificate stamps, series 1918.....						
PAID SECURITIES AUDIT.						
Certificates of indebtedness.....						
Liberty bonds retired.....			14,549	15,104,450		
War savings certificates.....			260,592	8,904,176		

DIVISION OF PUBLIC MONEYS.

The monetary operations of the Government have been conducted through the Treasurer of the United States, 9 Assistant Treasurers of the United States, 12 Federal reserve banks, 18 branch Federal reserve banks, the treasurer of the Philippine Islands, the American Colonial Bank of Porto Rico, and 1,331 national-bank depositaries.

To prevent disturbing the financial conditions on account of payments made in connection with subscriptions to Liberty bonds, Victory notes, and for the purchase of Treasury certificates of indebtedness, the Secretary continued the policy of specially designating incorporated banks and trust companies as depositaries of public moneys, thus permitting the subscribing banks to deposit by credit with themselves, until needed by the Government, the proceeds arising from the above-mentioned sources. Such deposits paid 2 per cent to the Treasury.

On July 1, 1918, there were 6,510 special depositaries which, with 3,040 designated during the past year, made the total number 9,550 on June 30, 1919. Of these 4,511 were national banks and 5,039 State banks and trust companies. Sixty-five of the original 88 banks designated in the drought-stricken districts of Texas and New Mexico, under the Secretary's announcement of March 21, 1918, were continued through a portion of the year 1919 for the purpose of aiding the stock-raising industry. These deposits were repaid into the Treasury during the year.

During the fiscal year of 1918, 11 depositaries were established in foreign countries for the purpose of enabling Government disbursing officers to make prompt payments in connection with the purchase of supplies and for payment of officers, enlisted men of the Army and Navy, and for other purposes. Eleven additional depositaries were

established for the same purpose during the year, so that on June 30, 1919, there were five depositaries in England, five in France, two in Belgium, three in Italy, two in Spain, one in Switzerland, two in Canada, and two in Argentina.

The amount of public moneys held by depositaries on June 30, 1919, was as follows:

Deposits in Federal land banks.....	\$500,000. 00
Deposits in Federal reserve banks.....	105,457,355. 50
Deposits in special depositaries, account of sales of certificates of indebtedness and Victory notes.....	905,397,000. 00
Deposits in foreign depositaries:	
To credit of Treasurer of the United States.....	24,641,009. 19
Deposits in national banks:	
To credit of Treasurer of the United States.....	45,492,512. 64
To credit of other Government officers.....	9,081,833. 82
Deposits in Philippine Treasury:	
To credit of Treasurer of the United States.....	6,299,935. 95
To credit of other Government officers.....	2,075,807. 01
Total of all funds with depositaries on June 30, 1919.....	1,098,945,454. 11

On June 30, 1919, there were 765 regular national bank depositaries, 12 Federal reserve banks, 18 branch Federal reserve banks, 566 temporary national bank depositaries, and 9,550 special depositaries for Liberty loan and Treasury certificates of indebtedness funds. Eight regular depositaries were designated for the convenience of Government disbursing officers in connection with Army cantonments, camps, and aviation fields during the year, and 25 regular and 24 temporary depositaries were discontinued; 3,193 special depositaries were designated and 153 discontinued.

Under the provisions of the act of October 6, 1917, and the proclamation issued thereunder by the President under date of October 12, 1917, the Secretary of the Treasury purchased from funds deposited by the Alien Property Custodian United States securities of the par value of \$109,612,500. There were on hand July 1, 1918, similar securities of the par value of \$39,122,000. Securities of the value of \$47,336,000 matured and were redeemed, the proceeds being reinvested as available. The total amount of such securities carried by the Secretary of the Treasury in the vaults of the Treasurer of the United States in trust for the Alien Property Custodian on June 30, 1919, was \$101,398,500.

One Federal land bank was designated as a depositary of public moneys during the year in accordance with the provisions of the act of July 17, 1916, and a deposit of \$500,000 was made therewith, which deposit has since been repaid to the Government.

As authorized by the act of January 18, 1918, amending act of July 17, 1916, the Secretary of the Treasury purchased during the fiscal year 1919 \$85,615,000 farm loan bonds. The department was carrying on June 30, 1918, \$56,970,000 of such bonds, and the

various Federal land banks repurchased bonds during the fiscal year 1919 to the amount of \$5,700,000, leaving the total amount of farm loan bonds on hand at the close of the year \$136,885,000.

On November 1, 1919, the total number of depositaries not including those carrying special deposits on account of subscriptions for Liberty bonds, Victory notes, and purchases of Treasury certificates was 1,295 and the amount held by them was \$45,140,659.63.

SECRET SERVICE DIVISION.

There were 510 arrests made by Secret Service agents or under their direction during the year. Nearly half of this number were for violations of sections 148 and 151 of the Federal Penal Code. Note raisers and check forgers were mainly responsible for this unprecedented record. Nine new counterfeit note issues were discovered in circulation, only two of which, however, were in any sense dangerous. Counterfeit notes amounting to \$22,839.10 were seized or captured. Sixteen thousand one hundred eighty-seven dollars and forty-eight cents in counterfeit coins were taken out of circulation or captured from the makers. One hundred and fifty-seven plates, 15 dies, and 109½ molds for note and coin counterfeiting, together with miscellaneous contraband property, such as presses, cutting machines, crucibles, ladles, etc., were seized.

The nine new counterfeit note issues discovered were as follows:

February 1, 1919, \$20 Federal reserve note, Bank of New York. Poor photo-lithograph.

February 24, 1919, \$10 Federal reserve note, Bank of New York. Poor photo-lithograph.

April 30, 1919, \$5 Federal reserve note, Bank of Chicago. Poor lithograph.

April 30, 1919, \$20 Federal reserve note, Bank of San Francisco. Photograph; not deceptive.

May 6, 1919, \$1 silver certificate. Photo-mechanical. Poor.

May 6, 1919, \$10 Federal reserve note, Bank of New York. Very poor lithograph.

May 20, 1919, \$1 Federal reserve bank note, Bank of Cleveland. Zinc-etched. Poor.

May 23, 1919, \$5 Federal reserve note, Bank of Chicago. Etched; deceptive.

June 14, 1919, \$20 Federal reserve note, Bank of Boston. Etched; deceptive.

In addition to their work in the suppression of counterfeiting, agents of the service investigated many cases of thefts of Government property, violations of the gold exporting, customs, and other laws relating to the Treasury Department and its several branches, as well as rendering valuable service in cooperation with the Food Administration and War Trade Intelligence Bureau.

REPORT OF THE SECRETARY OF WAR.

WAR DEPARTMENT,
Washington, November 11, 1919.

MR. PRESIDENT:

The reports herewith transmitted cover the operations of the War Department for the year 1919. A comprehensive report is in process of preparation by Gen. Pershing which, when completed, will cover in detail all the operations of the American Expeditionary Forces in France. I shall transmit that report to you upon its completion, and its publication as a separate document will no doubt be authorized. The general operations of the department are covered in the reports of the Chief of Staff and the heads of the operating divisions of the War Department in America. For the most part, they cover the fiscal year ending July 1, 1919, and must be read in conjunction with similar reports submitted in 1918 and 1917 to complete the story of the activities of the War Department from the declaration of war on the 6th of April, 1917, to the present time.

The armistice, which concluded hostilities on the 11th of November, 1918, called upon us to reverse the flow of men and supplies across the Atlantic. Up to that day the energies of the department were devoted to the acceleration of the processes by which our Army was selected, trained, transported to France, and supplied there. From the 11th of November our problems have been the return and demobilization of our soldiers, cancellation and adjustment of contracts for war supplies, the settlement of obligations between the War Department and the public authorities and nationals of our Allies in the war, and the formulation of a military policy for the country which would adjust the permanent Military Establishment to our needs and apply to its organization the lessons learned in the war. These diverse matters must be separately discussed.

Our battle field was in France. The problem was to select, train, equip, and transport soldiers in the largest number possible and to bring their weight to bear as early and as decisively as possible in order to shorten the war and assure victory. The United States entered the World War on the 6th of April, 1917; the armistice went into effect on the 11th of November, 1918—a period of one year, seven months and five days. During that time the size of the Army was increased from about 200,000 men, of whom 133,000 were in the Regular Army and 67,000 in the National Guard, to an aggregate of

3,757,624 men, of whom 2,086,000 were transported to France. At the end of 1917 our forces in France aggregated 194,000 men; during the succeeding months the number of men transported was as follows:

January.....	47, 853	June.....	278, 664
February.....	49, 110	July.....	306, 350
March.....	84, 889	August.....	285, 974
April.....	118, 642	September.....	257, 457
May.....	245, 945	October.....	180, 326

In the last six months of the war, therefore, substantially a million and a half men were transported to France, and in the great battle of the Meuse-Argonne, which lasted in all 47 days and came to an end with the signing of the armistice, 1,200,000 American soldiers participated, divided into 29 combat divisions and bringing to bear a fighting strength which drove the enemy out of defensive works, constructed through years of occupation, in which every scientific resource was exhausted to make them impregnable.

In attempting to measure the extent and success of the American military effort, certain limiting factors must be kept in mind. The most important and controlling of these was the capacity of troop and cargo transport available from time to time. Submarine warfare made heavy inroads upon the available ocean-going tonnage of the world. The estimated aggregate tonnage sunk is 9,236,483 tons, out of 25,140,000 tons under allied flags at the beginning of the war. It was early realized that ocean tonnage would play a controlling part both in the possibility of American participation on the European front and in the maintenance of food and other supplies for the European nations engaged. As a consequence, a great shipbuilding program was formulated in the United States, and from it rapidly increasing relief was experienced; but in March, 1918, when the spring offensive on the western front opened and the need for the immediate transportation of large numbers of American soldiers became apparent, the question of ships remained critical, and the response which America made to the demands of the situation was necessarily adapted to the tonnage available. Under your direction, preference was given to the shipment of infantry and machine-gun units, and it was only after the immediate menace of the German drive had been relieved that troops of other arms could be sent and our troops organized into complete divisions in France. As it was, of the total number of American troops transported to France, 49 per cent were carried in British ships.

The tonnage limitation, however, was even more severely felt in the matter of cargo. As the American Expeditionary Forces in France grew in numbers their needs correspondingly increased, and as American production of war materials got into its full swing vast

masses of material accumulated here awaiting transport. The situation, however, was such as to require the most intensive economy in cargo space and frequent changes in programs of shipments. The commanding general in France made out a schedule of priorities covering all supplies needed by him, and the supply departments in the United States used the tonnage available to supply first the needs indicated in the priority program. To save time and to save tonnage, supplies were purchased for the American Army in Europe whenever possible, and whenever an adequate supply of any needed article could be found in Europe its place on the priority shipping program was given to the next need for which American resources had to be relied upon. We had, therefore, constantly to balance our ability to transport troops against our ability to supply them and maintain them in the field.

Another limiting factor was the production or procurement of artillery. The facilities for the production of cannon in the United States prior to the war were very limited. In England and France great plants had grown up, feeding an increasing supply of these arms to their forces, and a very helpful arrangement was made with the French Government to supply divisional artillery to American troops which would have been quite adequate to the program originally adopted for the building up of the American Army. The department, however, set about the creation of additional facilities in this country, realizing the necessity of having an American source of supply. The report of the Chief of Ordnance shows the progress we had made when the armistice came, and had the war continued into another year American-made artillery would have completely solved the problem which the equipment of our rapidly increasing forces presented.

These facts are adverted to both to show the hearty cooperation of our British and French associates in the transportation and equipment of our forces, and also the success with which the United States addressed itself to the problem of creating independent sources of supply in ships and artillery, both of which require time and extensive industrial coordination for their production.

A third set of limitations arose out of the demands made upon American industry and raw material supplies by our Allies. The practical paralysis of production in the European countries during the war caused the Allies to rely more and more upon outside sources of supply. Prior to our own entry into the war the several European countries maintained elaborate purchasing agencies here, and drew heavily upon us for raw materials and finished products of every kind. When the United States came rapidly to increase its own Army, American industry was already intensively engaged in pro-

ducing the necessities of life for our own people and great quantities of subsistence and other materials upon which our Allies depended both for the needs of their civil populations and for their armies. It was not possible arbitrarily to cut off our associates in order that our own Army might be speedily equipped and supplied. We had constantly to bear in mind the needs of the Allies who were actually holding the fighting front, and of the civil populations back of their armies, upon whose morale the continuance of the conflict depended until our own forces could arrive in such numbers as to give decisive weight to the allied military power.

The allied purchasing agencies were, therefore, pooled and their requirements coordinated through an allied purchasing agency, which finally became associated with the War Industries Board, and there, daily, it was necessary to decide allocations of raw material and manufacturing facilities in order to distribute among these many urgent needs the available materials, as far as possible, in the order of their relative urgency.

The generous assistance rendered to the United States by Great Britain and France in the matters above referred to, and in many other ways, was reciprocated by action in this country which made common cause with our Allies in providing access to the material resources of the United States. One result of this was that on both sides of the ocean there was cooperation and mutual assistance, and much costly duplication of facilities was eliminated.

Another result, however, was the necessity constantly to deal with the limitations upon our ability to equip our own armies which this preference for the common cause entailed. There were shortages in equipment of the American Army which the stimulated and aggressive industry of America could easily have supplied but which were voluntarily endured in order not to cause a more distressing shortage in some important need of the nations associated with us.

Considerations of this kind abounded on every hand, as was to be expected, in an enterprise which represented the concentration of the financial, industrial, and commercial power of four great nations, and no judgment of the part played by any one of these nations is just which counts only the numbers of its soldiers or any other item of its activities which can be exhibited statistically and fails to note the extent to which cooperation required it to subordinate its own operations in the interest of the success of the combined effort. The spirit of this cooperation was splendid throughout. Nothing but a great cause understood and loved alike by the people of the several allied nations could have sustained it.

The simple beginning of the American Expeditionary Forces is found in the orders issued to Gen. Pershing on the 26th day of May, 1917. They are as follows:

From: The Secretary of War.

To: Maj. Gen. J. J. Pershing, United States Army.

Subject: Command, authority, and duties in Europe.

The President directs me to communicate to you the following:

1. The President designates you to command all the land forces of the United States operating in continental Europe and in the United Kingdom of Great Britain and Ireland, including any part of the Marine Corps which may be detached for service there with the Army. From your command are excepted the military attachés and others of the Army who may be on duty directly with our several embassies.

2. You will proceed with your staff to Europe. Upon arrival in Great Britain, France, or any other of the countries at war with the Imperial German Government, you will at once place yourself in communication with the American Embassy and through its agency with the authorities of any country to which forces of the United States may be sent.

3. You are invested with the authority and duties devolved by the laws, regulations, orders, and customs of the United States upon the commander of an army in the field in time of war and with the authority and duties in like manner devolved upon department commanders in peace and war, including the special authorities and duties assigned to the commander of the Philippine Department in so far as the same are applicable to the particular circumstances of your command.

4. You will establish, after consultation with the French War Office, all necessary bases, lines of communication, depots, etc., and make all the incidental arrangements essential to active participation at the front.

5. In military operations against the Imperial German Government you are directed to cooperate with the forces of the other countries employed against that enemy; but in so doing the underlying idea must be kept in view that the forces of the United States are a separate and distinct component of the combined forces, the identity of which must be preserved. This fundamental rule is subject to such minor exceptions in particular circumstances as your judgment may approve. The decision as to when your command, or any of its parts, is ready for action is confided to you, and you will exercise full discretion in determining the manner of cooperation. But, until the forces of the United States are in your judgment sufficiently strong to warrant operations as an independent command, it is understood that you will cooperate as a component of whatever army you may be assigned to by the French Government.

6. You will keep the department fully advised of all that concerns your command, and will communicate your recommendations freely and directly to the department. And, in general, you are vested with all necessary authority to carry on the war vigorously in harmony with the spirit of these instructions and toward a victorious conclusion.

These orders, it is to be observed, directed Gen. Pershing to proceed with his staff to Europe and gave him wide authority and discretion. They particularly directed him to establish all necessary bases, lines of communication, depots, etc., and to make all the incidental arrangements essential to active participation at the front, and they pointed out to him that in military operations against the Imperial German Government "the underlying idea must be kept in view that the forces of the United States are a separate and distinct component of the combined forces, the identity of which must be preserved." They intrusted to Gen. Pershing's discretion and judgment also the manner of cooperation between his command and the allied armies, so that from the first he was free to use his forces

as the exigencies of the situation might from time to time suggest, but always he was to keep in mind that the intention of this Government was that its military forces should be independent and that, when they had arrived at an adequate strength, they should conduct operations under independent command.

The communication between Gen. Pershing and the War Department was, of course, constant and voluminous. It dealt, however, with details of men and supplies. The authority conferred upon him by his original orders was never in any particular modified or diminished, and the fundamental view expressed in his initial orders as to the character of American participation was steadily adhered to under your direction to the end. Gen. Pershing left America with your full confidence and that of the War Department. Throughout the strenuous and sometimes terrible months of our participation this confidence supported and sustained him, and when he returned to America it was to close a great military undertaking, during which no shadow of misunderstanding had arisen between him and his Commander in Chief. The theory of these orders, of course, was that our field of operations was necessarily removed a great distance from Washington, that it was quite impossible for us to form accurate judgments of the varying incidents in the field of operations, and that imposing the tremendous responsibility for the success of the expedition upon its commander we could not do less than give him full authority and leave him untrammelled by attempts to formulate plans of action which, made at a great distance, could not be informed with knowledge of the situation which the commander at the front had when the plans reached him.

But if there was this confidence and full donation of authority upon the one side, there was a splendid response from the commander on the other side. Gen. Pershing and his staff proceeded to Europe, placed themselves in communication with the military authorities of Great Britain and France, studied earnestly the military operations on the western front up to the time of their arrival, measured the strength of the enemy and the resources of our allies.

There were elements in the problem which might well have caused grave apprehension. The armies of France, Great Britain, and Italy had borne for three years the furious and deadly assaults of the great German military machine, the toll levied by battle upon the manpower of these nations had been appalling, and it was becoming increasingly difficult for them to maintain their divisions at full strength. The submarine peril menaced the supply of munitions of war and of foodstuffs to great civil populations, which were called upon in increasing numbers to abandon production in order that they might give themselves as soldiers in the ranks or as workers in the munitions plants. Rigid economies were being enforced on every hand to make the scanty importations of food cover the wants of peoples

wasted by war. Meanwhile the German armies had crushed long-planned offensives by the allied armies with apparent ease, and by the collapse of Russia were daily being strengthened by divisions of trained soldiers brought from the eastern front until the menace of superior numbers and apparently inexhaustible supplies of the munitions of war haunted the councils of the allied powers.

But those who visited Gen. Pershing's headquarters during the war know that from the beginning there was resolution and a clear-sighted knowledge of the size of the task. It would have been idle to plan for a small American Army. On the other hand, it required imagination and daring to plan for a large one—to take a million American men to France, separate them from home by 3,000 miles of ocean, and subject them to the hazard of the uncertain and diminishing food supplies of Europe. To face the possibility of having such an army cut off from its home base without adequate munitions or subsistence was bad enough; but there still remained the question as to whether such an army could in fact be transported. History furnished no example, and the diminishing tonnage under allied control offered little encouragement; and there still remained the further question: If these difficulties could be overcome, could they be overcome in time?

Gen. Pershing and his associates gave no room to doubt and accepted no counsel except that of determination. They began at the seashore of France, deepening rivers and building great docks and warehouses, enlarging railroads, establishing supply bases and facilities, all on such a scale that when the critical hour came and the combined energies of the United States and Great Britain did surpass all previous estimates and land 2,000,000 men in France, the arrangements made for their reception and for their maintenance were found adequate; and had the war gone on and the 80-division program been carried out, the imagination and daring of these early plans would still have been adequate.

The detailed description of the things done in France must necessarily be left to the full report which Gen. Pershing is preparing. It is a wonderful story and exhibits at its best the confidence in their institutions which Americans may justly have. It exhibits also the talent of America flocking about the national standard in the hour of need, spending itself without reserve to do a great thing. There grew up in France a vast system of engineering and other undertakings in an incredibly short space of time, and they were a monument alike to the commanding general, to the great company who aided him there and here, and to the devotion of the American spirit, both abroad and at home, which gave itself intensely that the cherished blessings of civilization should not perish.

It is difficult in this report to refrain from commenting upon the thoroughness with which the purely military preparation in France

was made. A substantially new organization of tactical units was created, schools were established in order that the latest practice in the various arms and in staff work might be accurately taught, officers were trained in association with our veteran allies, and in turn trained their associates.

Throughout all of this, as in the earlier uses of our forces, there ran the thread of the original order which led to the ultimate organization and use of an independent American Army. It is not ungenerous to recall that the allied higher command hesitated to believe that it would be possible for the American Army, entering the contest so late, to acquire what they themselves had got by cruel experience from the beginning. Suggestions were constantly made that it would be wiser to fill in gaps with American troops and associate them in small units with the veteran French and British armies. Indeed, it became necessary after the German drive beginning in March, 1918, to depart temporarily from the settled plan, and Gen. Pershing in the presence of the emergency promptly placed his entire force at the disposition of the supreme commander and yielded to the request for the preferential shipment of infantrymen and machine-gun units and their speedy association with larger organizations of British and French troops, but in September, 1918, it was at last possible to undertake a great American offensive operation.

Some of our divisions remained associated with the British and French armies, and between March and September defensive and offensive operations were participated in by American troops; but from the time the battle of the St. Mihiel salient began the distinctive, independent American Army, occupying its own sector of the front, pressed relentlessly its attack, and in the combined operations which brought the war to a victorious conclusion the American Army bore its full share of the burdens of battle and contributed its full share to the allied success.

When the armistice came the American force in France exceeded that of Great Britain and was fast approaching that of France. The ration strength of the three forces showed the Americans 31 per cent, the British 28 per cent, and the French 41 per cent; of the length of the western front the American Army held 22 per cent, the British 19 per cent, and the French 59 per cent. Had the rate at which American troops were being transported continued a few months longer, the American Army would have exceeded in strength the French Army.

During the summer of 1918 Gen. Pershing recommended by cable that the American program contemplate 80 combat divisions in France for the campaign of 1919. Later studies led him to recommend an increase in this program to a strength of a hundred divisions. As these recommendations were made they required careful study. The operations of the selective service law promised

an adequate strength in man power, but the old limitations of troop and cargo transport capacity remained to be studied. The capacity of America to meet the increasing financial burden and to produce the necessary raw materials and the manufactured equipment and supplies, had also to be surveyed, for it must be remembered that we had constantly to measure the strength of America not merely in proportion to the military effort which our forces were making, but to add the contribution which the American farm, mine, and factory had to make to meet European allied needs.

The studies of these problems by the War Industries Board and by the Chief of Staff led to the conclusion that we could certainly meet the 80-division program. It was accordingly adopted, with the intention and understanding that it was to be the minimum of our effort and that all that could be added to it would be added to it, in order that in the campaign of 1919 our forces should be overwhelming and the war brought to a close.

The execution of the 80-division program, however, depended upon supplies of artillery to be procured in France, and tonnage for both troops and cargo to be procured in England.

Under your direction I visited both countries. In France the necessary arrangements were made for an adequate supply of artillery. At a meeting of the Interallied Maritime Council in London the tonnage needs for the 80-division program were frankly stated and a resolution taken that those needs should be satisfied if possible. The British Government continued, for our troop transport service, the ships which had been placed at our disposal earlier in the year to meet the emergency caused by the March drive of the German Army. Cargo tonnage also was placed at our disposal. Meanwhile our own Shipping Board further invaded the few commercial facilities which had been left to supply South America and the East with American products upon which they depend.

The result of all this was a great increase in the tonnage used by the Army. It was never adequate to prevent serious shortages in important items in the Expeditionary Forces, but it continued to increase and the production of ships in America finally led us to feel that by March of 1919 it would be possible for us to maintain our increasing army in France and release to very urgent British uses the emergency tonnage placed at our disposal under the arrangement made by the Interallied Maritime Council. Grave fears were constantly being expressed in the United States lest we should find ourselves unable to subsist the growing army in France. The problem was serious, but no chance not justified by the situation was taken and while there could not be much public discussion on the subject, the War Department watched with vigilance the changing aspects of the problem and in the end its judgment was vindicated by the event.

The net result of our effort at the time of the armistice was that from our entrance into the war we had transported to France 2,057,675 men, including marines, but not Army civilians, and up to November 1, 1918, had shipped 4,179,329 short tons of cargo. Gen. Pershing organized a purchasing agency, under the direction of Brig. Gen. Charles G. Dawes, through which he purchased in Europe the equivalent of 4,341,405 short tons of supplies. In part these purchases represented timber, forage, animals, artillery, and transport equipment, all of which were indispensable both to our construction enterprises and to the daily movement and subsistence of the Army. Without them, obviously, it would have been impossible for us to maintain so large a force. The report of Gen. Dawes, as Chief Purchasing Agent, will appear as a part of the comprehensive report to be made by Gen. Pershing. I single it out for comment here only because of the extraordinary zeal and success with which the operations of Gen. Dawes were conducted, and because of relief which his purchases afforded to us in the matter of tonnage, which, of course, was both the most compelling limitation upon our efforts, and the cause of our gravest anxieties.

It seems to me appropriate here to observe that the termination of the war in 1918 was to a certain extent unexpected. When I visited France in October, 1918, plans for the campaign of 1919 were still under earnest consideration. The American 80-division program was, of course, addressed to that campaign. Marshal Foch expressed confident belief in his ability to win the war in 1919, with the aid of 80 American divisions. The plans in this country, as well as those in Europe, were all made in anticipation of operations on a tremendous scale beginning in the spring of 1919.

We had failed to realize the effect of our accelerated troop movement, both in demoralizing the enemy and in strengthening the fighting efficiency of the allied armies on the western front. Had the great troop movement of the summer of 1918 not been carried out, the practically continuous battle on the western front from March to November would not have been possible. The conflicting armies would have stabilized their positions, spent the winter in fresh preparations, and in the spring of 1919 would have opened the decisive campaign. As it turned out, however, the combined strength at the disposal of the supreme commander enabled him to assume the offensive in July, and to hold it aggressively until the exhausted and beaten enemy was obliged to surrender.

The saving to the world in thus shortening the war is incalculable alike in life and treasure. The end came when America had completed but half of her program. It was enough to turn the tide. The full splendor of the strength of our people, however, appears only if one doubles the marching millions who passed through the Argonne Forest, and rested their arms when the armistice was signed. Had

the campaign of 1919 been fought our Army in France would have numbered 4,000,000 men; they would have been supplied from American sources (with artillery as a partial exception) with arms, munitions, and subsistence; they would have had adequate motor and animal transportation, and American-built ships would have insured the safety and adequacy of their supply. Coming suddenly, the termination of hostilities found us with great industrial enterprises nearing completion, vast accumulations of stores awaiting transportation, and with expenditures made from which no actual benefit was derived. These were all a part of the preparation for the campaign of 1919. Until practically the 1st of November the need for such a campaign seemed assured.

DEMOBILIZATION OF PERSONNEL.

Upon the signing of the armistice, it was necessary to throw into reverse the machinery which was at that time working at maximum capacity in pushing troops to France. The problem that now presented itself was the less exciting, although very important, work of demobilization.

The general plan for demobilization of the emergency Army had as its object the transfer of all men prior to their discharge to the demobilization camp in or nearest the State from which they entered the service, and there discharging them.

The purpose of this plan was to induce the men upon discharge to return to the community from which they came, to the end that they might again resume the places in the economic world which they had occupied before they became soldiers.

The following demobilization camps were utilized to carry out the plan. These camps had formerly been mobilization camps to which troops had been sent from local draft boards or other sources for training for overseas service.

Camp Beauregard, La.
Camp Devens, Mass.
Camp Dodge, Iowa.
Camp Grant, Ill.
Camp Gordon, Ga.
Camp Hancock, Ga.
Camp Lee, Va.
Camp Logan, Tex.
Camp Custer, Mich.
Camp Funston, Kans.
Camp Greenleaf, Ga.
Camp Kearny, Calif.
Camp Meade, Md.
Camp Sevier, S. C.
Camp Taylor, Ky.
Camp MacArthur, Tex.
Camp Pike, Ark.

Camp Shelby, Miss.
Camp Sherman, Ohio.
Camp Greene, N. C.
Camp Wadsworth, S. C.
Camp Jackson, S. C.
Camp Bowie, Tex.
Camp Dix, N. J.
Camp Travis, Tex.
Camp Humphreys, Va.
Camp Lewis, Wash.
Camp McClellan, Ala.
Camp Sheridan, Ala.
Camp Upton, N. Y.
Presidio of San Francisco, Calif.
Fort Logan, Colo.
Columbus Barracks, Ohio.

In accordance with cabled instructions from the War Department, the preliminary work necessary to be accomplished in France to facilitate demobilization in the United States was inaugurated shortly after the armistice. The demobilization of the temporary forces in the United States commenced at the same time by orders from the War Department. Since all organizations represented a fair proportion of men from all trades and commercial activities, and as no key or pivotal men had been drafted, the policy adopted was to demobilize by complete organizations as their services could be spared, thus insuring the maximum efficiency of those organizations remaining, instead of demobilizing by special classes with the resulting discontent among those not given preferential treatment and retained in the service, thus lowering their morale and efficiency and disrupting all organizations with the attendant general discontent.

The problem of demobilization of the United States forces was different from that of other countries, since its pivotal or key men had not been withdrawn from industry, nor had its man power been drafted to the same extent as that of our Allies; and while in the beginning there was considerable insistence from various sections for special classes of discharge, the adopted policy was pursued consistently throughout the entire process, no deviation therefrom being made except where the country as a whole was benefited, as, for example, in the discharge of coal miners, railroad men, and certain post office employees, or in well-established cases of distress and where men were essential to industry. In other words, the wishes of the individual were subordinated to those of the country he was serving.

The following brief description of the methods of demobilizing the overseas troops includes the process used for those that did not leave the United States:

All troops upon their departure from France for the United States were reported by cablegram as to strength, composition, and States from which they entered the service, or in which their homes were located. In the case of sick and wounded, the number was given, also whether bed-ridden or requiring no special attention.

Based upon this information, which was received approximately one week before their arrival in the United States, orders were issued by the War Department directing their distribution for discharge to the demobilization camps in or nearest their own States. In the case of sick or wounded, these were distributed to those hospitals fitted for handling their special class of disability which were located nearest the homes of the men, in order that they might be visited by their relatives with the minimum expense. When the sick and wounded had recovered, they were demobilized in the same manner as other troops. In certain cases some men were permitted to leave

the hospital while undergoing treatment, provided they were capable of being cared for by their relatives. As a protection to the country as a whole, no cases of contagious or infectious diseases, such as venereals, were released from Government treatment until they were either completely cured or were no longer a menace to the public health.

Prior to the departure of troops from France, they were subjected to a careful physical examination, disinfection, and provided with clean clothing throughout. Those found with communicable diseases or otherwise sick were separated from the well and placed in separate organizations with appropriate medical attendance.

Upon reaching the United States, the troops were again subjected to the disinfecting process in order that upon their being scattered throughout the United States the public would be safeguarded against the possible spread of disease. En route to the United States, the personnel adjutant assigned to each transport assisted the troops in the preparation of records and reports, and furnished useful information to the end that the work of demobilization might proceed smoothly upon their arrival at the debarkation camp at the ports. The troops en route to the United States having been assigned to their debarkation camp by the port authorities prior to their arrival, the unloading of troops, their transportation and assignment to quarters in the camps at the port were accomplished expeditiously, efficiently, and without confusion.

At the debarkation camps which were operated by the Transportation Service, troops were disinfected, as stated above, surplus equipment taken into store, records verified, completed in whole or in part, troops paid in full and distributed into companies or detachments destined for the same demobilization camp; demobilization camp commanders were advised of the numbers to be sent to their camp, with dates of departure from port and arrival at camp, and the troops shipped thereto for discharge from the service.

Companies of men sent to the United States from France for discharge due to emergency were discharged without delay at a camp near the port, instead of being sent to the camp nearest their homes. These were exceptions to the rule where speed in separating them from the service was the essential element.

Upon arrival at their proper demobilization camp, the following process which was followed indicated the method pursued in the discharge of men of the emergency army. Every safeguard was employed to the end that both the Government and the individual might be protected and that the individual, in so far as it was possible to do so, might be assisted in returning to his former life in the civil world, or placed in some employment suited to his taste and ability.

The soldier about to be discharged was first taken to the medical discharge board where he was disposed of as follows:

If his statement as to his physical condition, and that of the medical discharge board as determined by a physical examination agreed, he was sent to the records team, where his service record was completed. In the event of disagreement, the soldier was sent to a medical board of review which determined the percentage of his disability. He was then sent to the insurance section which prepared the necessary compensation blanks for him and then to the Federal Board for Vocational Training which advised him on the subject of training in order to fit himself to make a living. Upon completion of this routine the soldier went to the records team.

All men who were not in the same physical condition as when they entered the service, and who had not attained their maximum improvement, were retained in the service and sent to a base hospital for treatment.

At the records team each man's records were completed, and as he passed through this team he was asked by a representative of the United States Employment Service whether or not he had a job, or wished one. If he had a job, and was not doubtful of his retention thereof, nothing was done in his case. If he was doubtful he was registered and given a card to his nearest local representative. If he had no job, he was directed to report to the United States Employment Camp representative, where every effort was made to secure a job for him.

After leaving the records team he was, at a scheduled time, sent to the finance officer and paid; to the camp railroad ticket office where he purchased his ticket, and to the train for entrainment to his home or place of entry into service.

Arrangements were made by the camp authorities for special trains in order that men from the same locality might return in a body for such reception as their home people might desire to extend to them. A reduced railroad fare of 2 cents per mile was granted to men traveling within 24 hours from date of discharge as an added inducement to return to their homes without delay.

To enable the people to see organized bodies of troops which had served in the battle fields of France, regiments or other organizations to the extent of several hundred thousand men were stopped at the cities which they represented for parade and reception while en route from the port of debarkation to their demobilization camps.

While at the demobilization camp awaiting discharge, lectures were given on the subject of their war-risk insurance, allotments, compensation, and Liberty loan allotments. Special representatives were at the camp whose duty it was to explain doubtful points, and to assist in protecting the financial rights of the soldiers.

While the troops were en route from France, in the debarkation camps, en route to demobilization camps, at such camps, and en route to their homes the various welfare organizations did everything in their power to provide for their comfort and amusement.

The following table shows the number of officers and enlisted men discharged, by months, from the date of the signing of the armistice to October 11, 1919:

Month.	Officers.		Enlisted men.	
	Number.	Cumulative.	Number.	Cumulative.
1918.				
Nov. 11-30.....	593	593	43,000	43,000
December.....	37,043	37,636	609,000	652,000
1919.				
January.....	23,563	61,199	358,000	1,010,000
February.....	14,913	76,112	263,000	1,273,000
March.....	11,479	87,591	263,000	1,536,000
April.....	12,185	99,776	298,000	1,834,000
May.....	14,622	114,398	383,000	2,217,000
June.....	13,588	127,986	391,000	2,608,000
July.....	16,404	144,390	361,000	2,969,000
August.....	15,986	160,376	151,000	3,120,000
September.....	8,716	169,092	73,000	3,193,000
October.....	8,690	177,782	33,000	3,226,000
Nov. 1-10.....	2,018	179,800	10,266	3,236,263

During the earlier period of this rapid demobilization the problem of unemployment on the part of the returned soldiers presented serious difficulties. The industry of the country was itself in process of reorganization; factories which had been converted to make munitions of war had to be reconverted to peace-time production, contracts for war supplies were canceled, and there was a necessary interval before the channels of trade could be cleared and the resumption of ordinary business effected. Very close cooperation was established with the Department of Labor in dealing with this situation. Weekly reports were received from every section of the country, showing the demand for labor and the extent of unemployment; and for a brief time in some demobilization camps discharges were delayed, except in the cases of men who desired to be discharged, in order not to add to a prevalent surplus in the supply of labor. An agency was set up in the War Department to aid discharged officers and soldiers to find employment. It did not operate an employment agency, but appealed successfully to the chambers of commerce, local councils of defense, business men's associations, and other bodies in the industrial centers and, by giving a certain leadership and direction to their several efforts, greatly relieved the condition.

Throughout the whole country there was an instant response to the appeal of the returned soldier. The old job or a better one awaited him wherever industrial conditions became sufficiently normal to allow his employment. Often employers took their old men back before they had jobs for them, and many made places for men whom they had not previously employed, rather than see a soldier turned away.

The work of the War Department bureau was most effective. It distributed literature addressed to employers, explaining the state of mind of the returned soldier who, having served his country in the field, came back with a larger sense of his relations and a higher purpose in his civil life. It distributed literature also addressed to the soldier, pointing out that success in civil life is due to merit, and that he must, therefore, seek his new opportunity not only on the basis of his past services in the field, but on the prospective value of his work to his employer. Happily, the resumption of industrial activity in the country was speedy, and the readjustments necessary were made without serious difficulty.

The world needs the utmost effort of America as a producer of raw materials and finished products; its depleted supplies can not be made up by so ready a resumption in the war-devastated countries of Europe, where the losses in man power and destruction of facilities has been so great. It is fortunate that this duty laid upon American industry and enterprise can be met by the addition to the ranks of our workers of 4,000,000 young men, many of whom have learned to realize the world's need of their work by what they have seen of the world's losses, and all of whom have been strengthened in body and purpose by the service which they have rendered.

The extent to which our population was absorbed in war work of one kind and another is interesting. Demobilization, of course, meant not merely the demobilization of the soldiers, but readjustments involving the occupations of the civil population. At the time of our entrance into the war the population of continental United States was probably 105,000,000 people, of whom 54,000,000 were males and 51,000,000 were females. Nearly half of the males were old men and boys, and nearly half of the females were old women and girls, so that these two groups, aggregating almost half of the total population, may be considered as relatively not of producing age. With such an assumption the distribution of the entire 105,000,000 population during the war was probably about as shown in the following table:

Occupations of Americans during the war.

	Number.	Per 1,000.
Men in France fighting.....	1,400,000	13
Men in France behind lines.....	600,000	6
Men in Army in United States.....	1,700,000	16
Men in Navy.....	550,000	5
Men in war work in United States.....	7,150,000	68
Men in nonwar work in United States.....	18,600,000	178
Total men of producing age.....	30,000,000	286
Old men and boys.....	24,000,000	229
Total males.....	54,000,000	515
Women in war work.....	2,250,000	21
Women in nonwar work.....	25,750,000	245
Total women of producing age.....	28,000,000	266
Old women and girls.....	23,000,000	219
Total females.....	51,000,000	485
Grand total.....	105,000,000	1,000

The figures of the table give us a basis for classifying each 100 people according to their occupations before the war and during the war. In this classification the number of American soldiers on the fighting line in France has been considered as being substantially equal to the number of American soldiers behind the line in France. This is probably in fair accord with the typical facts, although more than half of the men who reached France saw actual fighting. The distribution is presented in the table below:

Distribution of each 100 American citizens.

	Popu- lation in peace time.	Population in war time.
Producing men.....	29	1 fighting in France. 1 in France not fighting. 2 other soldiers and sailors. 7 civilian war workers. 18 nonwar workers.
Old men and boys.....	23	23 old men and boys.
Producing women.....	26	2 war workers. 24 nonwar workers.
Old women and girls.....	22	22 old women and girls.
Total.....	100	100

A further computation would distribute each 100 men of producing age about as follows:

Fighting in France.....	3
Behind the lines in France.....	3
Other soldiers and sailors.....	7
Civilian war workers.....	24
Nonwar workers.....	63
Total.....	100

Of each 100 women of producing age there would be about 4 war workers and 96 nonwar workers.

The figures illustrate not only the difficulties of demobilization, but they are suggestive also of the intensity and exclusiveness of the mobilization of the man power, both military and nonmilitary, of a nation required by modern war:

RECORDS ON DEMOBILIZATION.

When it became apparent that the armistice was imminent and that demobilization would probably begin in the immediate future, measures were taken for the preparation and disposition of the necessary records, both individual and organizational. The demobilization of such an enormous Army as had been mobilized was unprecedented in the United States, and new forms for accurate record had to be devised and the necessary instructions for the accomplishment of the forms and the filing of them published to the service.

Such forms and instructions were ready and distributed for use when demobilization was ordered.

The individual records of officers and enlisted men were forwarded to The Adjutant General of the Army for proper filing for future reference.

The records of organizations were either forwarded to The Adjutant General of the Army for filing and future reference or were retained at the demobilization camps for use. As one camp after the other was demobilized or abandoned the records were placed at a contiguous camp for file.

It is almost impossible to visualize the great volume of records that for the protection of the Government as well as of the individual soldier must be kept properly filed for immediate reference.

One record, the service record of the enlisted man, upon complete demobilization of 4,000,000 men requires 12,000 running feet of filing space, and this is but one of the several records filed for enlisted men.

For the purposes of demobilization there have been issued to the service approximately the following number of blank forms:

Form No. 135-3 A. G. O. (report of physical examination of enlisted men prior to separation from service in the United States Army), 5,420,000.

Form No. 395-1 A. G. O. (report of physical examination of officers prior to separation from service in the United States Army), 330,000.

Form No. 525 A. G. O. (honorable discharge, enlisted men), 4,775,000.

Form No. 525-2 A. G. O. (honorable discharge, officers), 233,000.

Form No. 525-3 A. G. O. (honorable discharge, officers serving under bureau chief), 30,000.

Inserts for service records of enlisted men, 6,070,000.

Pasters for service records of enlisted men, 6,400,000.

Final indorsement for service record of enlisted men, 5,010,000.

Appendix to file record card of officer, 225,000.

Circular of information concerning war-risk insurance, 5,130,000.

ACTIVITIES OF RESERVE OFFICERS' TRAINING CORPS (INCLUDING THE STUDENTS' ARMY TRAINING CORPS), FOR THE YEAR 1919.

Following the cessation of hostilities consequent upon the signing of the armistice, the demobilization of the Students' Army Training Corps and the reorganization of the Reserve Officers' Training Corps in the schools and colleges of the country was at once undertaken. The discontinuance of the Students' Army Training Corps involved the discharge of 3,961 officers and some 170,000 men, and the settlement with the institutions of 687 contracts involving \$12,535,957.39.

Units of the Reserve Officers' Training Corps were reestablished in secondary and collegiate institutions throughout the country and a comprehensive program was undertaken for the training of candidates for commissions in the Officers' Reserve Corps. Under the emergency authority granted to the President during the war, an allotment of 1,000 commissioned officers was made for the work. By the close of the academic year, June, 1919, units had been established in 191 collegiate and 128 secondary institutions and more than 90,000 students were undergoing instruction. Officers of the Army detailed as instructors numbered 635, assisted by 599 noncommissioned officers. One hundred and fifty-one applications for units, to be organized with the opening of the school year in September, 1919, were received. During the summer of 1919 Infantry training camps of six weeks' duration were conducted for the Reserve Officers' Training Corps at six of the Army cantonments, and a Coast Artillery Camp at Fort Monroe, attended by 3,405 students. With the commencement of the academic year in September-October, 1919, it became apparent that the officer personnel for duty with the Reserve Officers' Training Corps would necessarily be materially reduced, due to the demobilization of the Army and the discharge of temporary officers. The limited commissioned personnel available for this duty has rendered it difficult for the War Department to meet the widespread demand on the part of institutions for the establishment of units and the detail of commissioned and non-commissioned officers as instructors. On September 1, 1919, the Committee on Education and Special Training, under whose control and supervision the Reserve Officers' Training Corps was placed during the war, was ordered demobilized, and such control passed to the Director of the War Plans Division of the General Staff. A branch of this division to be known as the Reserve Officers' Training

Corps Branch was organized for the supervision of all matters affecting the establishment and maintenance of the Reserve Officers' Training Corps.

The supervision of military instruction in schools and colleges under the provisions of General Order No. 48, War Department, 1916 (sec. 56, act of June 3, 1916), General Order No. 70, War Department, 1913 (sec. 1225, Revised Statutes), and the act of April 27, 1914 (issue of rifles and ammunition to schools for purposes of target practice), is also vested in the War Plans Division and directly conducted by the Reserve Officers' Training Corps Branch. These institutions, while not maintaining units of the Reserve Officers' Training Corps, are given Government assistance in military training by the issue of arms, equipment, and ammunition. Army officers may be detailed as instructors if available.

The following table shows the organization of the Reserve Officers' Training Corps on October 31, 1919:

<i>Summary.</i>	
1. Infantry Senior.....	units.. 148
Infantry Junior.....	do.. 127
Cavalry.....	do.. 7
Coast Artillery.....	do.. 21
Field Artillery.....	do.. 22
Signal Corps.....	do.. 10
Engineer.....	do.. 19
Ordnance.....	do.. 10
Motor Transport Corps.....	do.. 10
Total.....	374
2. Number of institutions at which units are authorized or approved for organization.....	269
3. Incomplete reports on enrollment indicate that approximately 100,000 students are undergoing training in the above units.	
4. Schools operating under G. O. No. 48, W. D. 1916.....	23
Schools operating under G. O. No. 70, W. D. 1913.....	15

AMERICAN FORCES IN GERMANY.

About the time that the General Headquarters of the American Expeditionary Forces left France, the Army of Occupation in Germany was greatly reduced, and the designation consequently changed to "American Forces in Germany." As now organized (Oct. 11, 1919) these forces have a strength of 519 officers and 10,399 enlisted men and consist of the following organizations with headquarters at Coblenz: Eighth Infantry; Second Battalion Sixth Field Artillery; Company A of the First Engineers; Second Pioneer Infantry less the First Battalion and Companies G, H, I, and K; Seventh Machine Gun Battalion; Evacuation Ambulance Company No. 26; Field Hospital No. 13; Motor Command No. 41; Motor Transport Companies No. 333, No. 334, No. 335, and No. 336; Butchery Company No. 351;

Field Remount Squadrons No. 311, No. 314, No. 322, and No. 334; Mobile Laundry Company No. 318; and First Supply Train Companies A, B, C, and D.

A provisional brigade, consisting of the Fifth and Fiftieth Infantry and attached troops (Headquarters Motor Command; Motor Transport Companies 737 and 405; Service Park Unit No. 540; Provisional Machine Gun Battalion; and Company D, First Engineers) with a strength of 236 officers and 4,330 enlisted men, is now en route to Coblenz, with a view to its possible use in Silesia.

The question of supplying our forces along the Rhine was at the outset a problem that required serious consideration. For many reasons it was difficult to use French railroads for the shipment of supplies, and after careful study of the situation it was decided that the Rhine should be used as a line of communication for our forces. Accordingly, Base Section No. 9 was created with headquarters at Rotterdam and Antwerp. This base section, which was to be used only for the purpose of transshipping freight up the Rhine, was never used for the Army of Occupation, but is now being put into operation for the reduced Rhine garrison.

AMERICAN EXPEDITIONARY FORCE—NORTHERN RUSSIA.

During the summer of 1918 the situation in Russia presented a problem which demanded serious consideration. The chaotic state of the Government, the distress among the Russian people, the intrigues and activities of German prisoners of war, had produced a situation which had to be met and solved. After careful consideration the Supreme Interallied War Council decided to send an expeditionary force to Archangel in order to prevent the Germans from using that port as a submarine base, and to guard allied supplies which might be there, or which would be landed there in the future. The Government of the United States approved of this project and decided to cooperate in it. Accordingly it mobilized at Aldershot, England, a force consisting of the Three hundred and thirty-ninth Infantry, the First Battalion of the Three hundred and tenth Engineers, the Three hundred and thirty-seventh Field Hospital, the Three hundred and thirty-seventh Ambulance Company, and the Three hundred and tenth Sanitary Train. Col. George E. Stewart, Three hundred and thirty-ninth Infantry, was placed in command of this force and reported for duty to Gen. Poole, commanding officer of the British forces, at Archangel on September 4, 1918.

The mission of this expedition, according to instructions prepared by the United States Ambassador to Russia, was as follows:

As the Government of the United States sees the present circumstances, military action is possible in Russia now only to render such protection and help as is possible to steady any efforts at self-government or self-defense, in which the Russians them-

selves may be willing to accept assistance, whether from Vladivostok or from Murmansk and Archangel. The only present object for which American troops will be employed will be to guard military stores which may subsequently be needed by the Russian forces, and to render such aid as may be acceptable to Russians in the organization of their own self-defense. With such objects in view the Government of the United States will cooperate with the Governments of France and Great Britain in the neighborhood of Murmansk and Archangel.

The forces under Col. Stewart remained in North Russia from September, 1918, to June, 1919. During this time they occupied various positions along the Vologda Railroad and the Onega, Dvina, and Vaga Rivers, and engaged in many minor operations against enemy forces. The following is the list of casualties in this force:

Killed in action.....	109
Died of wounds.....	35
Died of disease.....	81
Died of accident and other causes.....	19
Total deaths.....	244
Wounded.....	305
Taken prisoner (all released).....	4
Total casualties.....	553

After the armistice was signed, it was impossible to remove this detachment, owing to the climatic conditions which forbade the movement of large bodies of troops or large amounts of supplies. In April, 1919, Brig. Gen. W. P. Richardson arrived at Archangel and took command of all troops of the American Expeditionary Forces in North Russia. The One hundred and sixty-seventh Company, Transportation Corps, came at the same time, but stopped at Murmansk in order to cooperate with the One hundred and sixty-eighth Company, Transportation Corps, which had arrived in March, 1919, and was then engaged in construction on the Murmansk Railroad. During the month of June, 1919, all the forces of the United States were withdrawn, except a small detachment of Engineers. In September the last personnel of the American forces in northern Russia were en route to the United States.

AMERICAN EXPEDITIONARY FORCE—SIBERIA.

During the summer of 1918 the Czecho-Slovak armies operating in Siberia were threatened with destruction by hostile forces apparently organized by, and often largely composed of, enemy prisoners of war. It was of importance to the Government of the United States that these friendly Czecho-Slovak forces be rendered assistance and that the Russian people be aided in every way acceptable to themselves in any and all efforts to regain control of their own affairs and their own territory. As Japan and the United States were the only powers in a position to act in Siberia in sufficient force to accomplish the

¹ Includes 28 presumed killed in action.

purpose sought, the Government of the United States proposed to the Government of Japan that each of the two Governments send a force of a few thousand men to Vladivostok, and the Japanese Government consented.

The American Expeditionary Force sent to Siberia was composed of the Twenty-seventh Infantry, the Thirty-first Infantry, one field hospital, one ambulance company, Company D of the Fifty-third Telegraph Battalion, Evacuation Hospital No. 17, Base Hospital No. 93, Medical Supply Depot No. 7, two sections of Bakery Company No. 391, and 5,000 men from the Eighth Division. The command of this force was given to Maj. Gen. William S. Graves. These troops arrived at Vladivostok, Siberia, from San Francisco and Manila in several contingents, and by the end of September, 1918, the whole force had landed.

Gen. Graves disposed his forces at Vladivostok, along the Trans-Siberian Railroad, and stationed a detachment at the important mines of Suchan. In June, 1919, the first minor engagement with Bolshevik forces took place at Uspanka. This was followed by other minor operations against partisan bands and anti-Kolchak forces.

During the summer of 1919 an organized effort was made to procure voluntary applications for service in Siberia and to return and discharge, as fast as possible, all men who were enlisted or drafted for the emergency.

These replacements were sent to Siberia on the dates and in the strengths listed below:

June 5.....	9
July 5.....	67
July 25.....	690
Aug. 15.....	1, 270
Sept. 10.....	267
Sept. 13.....	992
Total.....	3, 315

The following is the list of casualties suffered by the American forces in Siberia to October 1, 1919:

Killed in action.....	28
Died of wounds.....	8
Died of disease.....	41
Died of accident and other causes.....	27
Suicide.....	5

OCCASIONS UPON WHICH IT HAS BEEN FOUND NECESSARY TO USE
FEDERAL TROOPS TO PRESERVE LAW AND ORDER SINCE JUNE
30, 1918.

Since July 1, 1918.—Globe, Miami, Ray, Jerome, and Ajo, Ariz. I. W. W. activities, etc. Detachments of United States troops and United States guards have been stationed at these points. Considered necessary by the governor of the State.

August, 1918.—Columbus, Ga. Street-railway and cotton-mill strikes. United States troops sent from Camp Gordon, Ga., on request of the governor of the State.

September, 1918.—Flat River, Mo. Guarding and preserving order at lead and zinc mines. Detachment of 1 officer and 32 enlisted men.

October, 1918.—Jerome, Ariz. Strike of miners. A detachment consisting of 3 officers and 50 enlisted men, commanded by Lieut. Col. Biegler, was sent to this place to take charge of the strike. This detachment was in addition to the regular garrison thereat and arrived October 25.

November, 1918.—Winston-Salem, N. C. Race riots. Detachment of United States guards, commander, Maj. G. B. Wilcox, from Camp Greene, N. C. Detachment consisting of 18 officers and 250 enlisted men, 2 machine guns, 2 automatic rifles, and 1 small tank, commanded by Col. Clopton, from Camp Polk, N. C. These detachments assumed duties November 17, and the larger part of each returned to their stations November 19, leaving about 100 troops at Winston-Salem.

January, 1919.—Blairsville, Union County, Ga. Disorder was created by certain deserters in the mountains resisting arrest. Detachment consisting of 2 officers and 30 men sent upon request of governor of State.

February, 1919.—Seattle, Wash. Shipyard strikes. Detachment Brig. Gen. Hayden commanding, consisting of headquarters, machine gun company, and two battalions of First Infantry from Camp Lewis, Wash., arrived February 6, 1919.

Tacoma, Wash.—Shipyard strikes. Detachment Brig. Gen. Watson commanding, consisting of one battalion First Infantry and provisional machine gun company from Camp Lewis, Wash., arrived thereat February 6, 1919.

Butte, Mont.—Strike of miners. United States troops, consisting of Company C, Forty-fourth Infantry, from Fort George Wright, Wash., and Companies A and D, Forty-fourth Infantry, from Fort Lawton, Wash., were dispatched to this place for strike duty, Brig. Gen. F. B. Watson commanding. Company E, Forty-fourth Infantry, Capt. W. D. Wilson commanding, was the original garrison at this place. All the United States troops except Company E left for their proper stations February 22, 1919.

Jerome, Ariz.—I. W. W. strikes. A detachment of United States troops stationed thereat handled the situation.

March, 1919.—Gerard, Ga. (2 miles from Camp Benning). Labor strikes. Detachment of 1 officer and 16 enlisted men sent from Camp Benning, Ga., on March 3, upon request of governor of the State.

May, 1919.—Charleston, S. C. Race riots (Negroes and sailors). Detachment consisting of Capt. Everett with 50 enlisted men, Forty-sixth Infantry, upon the request of the chief of police, took charge of the situation.

July, 1919.—Washington, D. C. Race riots. All available troops in the city, 80 officers and 1,153 enlisted men, commanded by Maj. Gen. Haan, took charge of the situation upon request made by the superintendent of the Metropolitan police department.

September, 1919.—Omaha, Nebr. Race riots. Detachments consisting of 11 officers, 152 enlisted men, Fourth Division machine gun company; 13 officers and 190 men, Seventh Division; 18 officers and 512 men, Sixth Division; under the command of Maj. Gen. Leonard Wood, took charge of the situation.

October, 1919.—Elaine, Phillips County, Ark. Race riots. Detachment of 600 United States troops, commanded by Col. Jenks, was sent from Camp Pike, Ark., upon request of the governor of the State. This detachment arrived October 2, 1919.

Gary, Ind.—Strike of steel workers. Detachments consisting of 105 officers and 916 enlisted men, Fourth Division, and 18 officers and 512 enlisted men of the Sixth Division, arrived October 6, Maj. Gen. Leonard Wood commanding the troops.

In addition to the above use of troops, there have been numerous detachments of United States troops and United States guards guarding property and preserving order at munitions plants and other manufacturing concerns. These, however, are considered strictly as military duties with the United States Government.

THE HIGHER EDUCATION OF OFFICERS IN THE ARMY.

Immediately after the signing of the armistice, studies were begun on the revision of the educational system in the Army, with a view to modifying the prewar system where the lessons learned in the war indicated changes were necessary to make the system meet modern military requirements. Studies were prepared by selected officers in the American Expeditionary Forces, France, and by the General Staff in the War Department; the system adopted was based on what was considered best and most practicable of the two studies.

The war demonstrated that there was a necessity for a more thorough and extensive education of officers in all grades and in all classes of military duty; that there was not uniformity of doctrine or

methods in the separate arms, or in the Army as a whole; that our prewar system did not secure progression of instruction in accordance with the advancement in rank of the officer; and that there was not continuity of instruction throughout the entire system from the bottom to the top. Notwithstanding these deficiencies of the prewar system, it was realized that this system had been an evolution of years during which time the United States had had little modern war experience; that whatever the shortcomings of this system, the greatest was that it did not exert enough influence on the training and instruction in the Army as a whole, and, to overcome this, it is necessary to increase the capacity of the different school plants and to establish new ones where necessary.

The war has also demonstrated the necessity for broader scope of instruction of officers in all grades. New weapons and new methods of warfare have made necessary greater knowledge of combat principles and tactics, of supply and of means of communication, on the parts of all officers from the commanders of platoons to the commanders of higher tactical organizations such as divisions, army corps, and armies, and it has been made specially apparent that General Staff officers for duty with the War Department and for larger expeditionary forces should have broader knowledge, not only of their purely military duties, but also a full comprehension of all agencies, governmental as well as industrial, necessarily involved in a nation at war, to the end that coordinated effort may be secured from all these agencies, and that they may be employed economically and efficiently both in the preparation for and during the war.

While the demands on the individual officer have increased, correspondingly have the requirements of the enlisted men, especially in the different classes of noncommissioned officers and specialists of the different arms and services.

With the above consideration in mind the Military Educational System has been put into effect, as far as practicable to do so, by War Department orders. The system embraces special service schools for officers and enlisted men, for each arm and service requiring them, having for their object the development and standardization of instruction and training of officers and enlisted men in the technique and tactics of the respective arm or service. The courses of instruction comprise:

(a) Basic courses for all officers upon entry into the Regular Army so as to qualify these officers that they may function intelligently on being assigned to duty with troops. These courses include instruction on those fundamental subjects common to officers of all arms, and such tactical and technical training in the particular arm, including training methods and principles of teaching, as may be necessary for officers of the lowest rank in the arm or service.

(b) Advanced courses for officers, to continue the education of the officer in accordance with his rank so as completely to fit the graduate for the performance of all duties that devolve upon officers of the respective arm or service as a specialty.

(c) Special courses for officers and enlisted men for the development of specialists in the use of arms and equipment peculiar to the arm or service with a view to providing instructors for troops in these specialties and for the training of selected noncommissioned officers in the duties of junior officers of their respective arm or service.

It has been considered desirable to designate these special service schools by the name of the arm or service operating them, that a better understanding may be had as to their object.

For some of these special service schools the prewar plants are being used. The Coast Artillery School, Fort Monroe, Va., the Cavalry School, Fort Riley, Kans., the School of Fire for Artillery, Fort Sill, Okla., are being so used. For the other arms and services the prewar plants that were formerly in use are not sufficient in number or in capacity for necessities made apparent by lessons of the war, and it has been proposed to retain and make use of for this purpose certain plants acquired during the emergency, so that the needs of all arms and services may be satisfactorily met. Owing to the difficulties in securing necessary personnel as students and instructors during the period of demobilization and reorganization of the Army, and the uncertain status of the new plants for these schools, the establishment of courses at the special service schools to the full extent intended has not been possible. The basic courses and limited courses for specialists have been maintained throughout the year.

GENERAL SERVICE SCHOOLS.

The School of the Line has for its object the training of officers (a) in the combined use of all arms and services functioning with a division, including the functioning of corps and army troops and services, and (b) in the duties and responsibilities of field officers with regard to education and training of the Army. This school was reestablished at Fort Leavenworth, Kans., September 1, 1919, with a class of 150 field officers.

The General Staff School has for its object the training of selected officers for duty as General Staff officers with tactical units and for higher tactical command. In addition, special courses will be conducted for general officers and selected officers of the technical and administrative services with a view to insuring harmonious cooperation throughout the service. The General Staff School is located at Fort Leavenworth, Kans., and a course for the instruction of a class of 50 selected officers began on September 1, 1919.

The General Staff College was established at the War College, Washington, D. C., September 1, 1919, with a class of 75 selected officers. This college, the highest in the school system, has for its object the training of selected officers for duty in the War Department General Staff and for high command. In addition it will conduct such special courses for general officers and selected officers of the technical and administrative services as may be prescribed with a view to insuring harmonious cooperation in the War Department organization and in the military service in general. In addition to study of those subjects of purely military character, the General Staff College will take up studies of an economic nature in regard to supply in general and industrial activities necessarily employed in war with a view to securing cooperation and coordination of the governmental and industrial agencies of the Nation.

While the special service and general service schools are for the military education of the individual, the greatest benefit to be derived therefrom is in the use of the graduates of these schools in the training of troops in general, and in the maintenance of the unit schools for officers and enlisted men.

UNIT SCHOOLS FOR OFFICERS AND ENLISTED MEN.

These schools take the place of the former garrison schools for officers and noncommissioned officers' schools. The primary object of these schools is the instruction and training of officers and noncommissioned officers with a view to securing uniform and efficient training of troops. This requires that, to the greatest extent, the instruction at these schools should be conducted concurrently with and be definitely and closely coordinated with the schedules of training or work of the troops.

It is contemplated, as soon as the educational system is completely organized, to use the schools to the fullest practical extent for the instruction of officers of the National Guard and Reserve Officers' Corps, as provided for by law, with a view to the advancement of these officers in military knowledge and usefulness. It has been impracticable to undertake the work during the present year.

EDUCATION IN THE ARMY SINCE THE ARMISTICE.

After the signing of the armistice immediate steps were taken to discontinue the Army's extensive educational work, which had been developed as a necessary factor in the mobilization machinery, but in doing this, to preserve as far as possible for the future the many valuable lessons in training learned from the war experience.

Early in December the colleges were invited to reestablish the Reserve Officers' Training Corps training, with greater attention to units of the special corps. New regulations have been published

permitting greater emphasis on camp work and closer cooperation between the schools and the War Department in the matter of technical instruction. As a result there are now 351 units in 264 educational institutions with a total enrollment of 100,000 students.

During the winter careful study was given to the problem of reorganizing the various service schools and establishing a permanent educational system for the Army. On the basis of the plans matured in this study, Congress appropriated \$2,000,000 to support vocational training in the Army. The responsibility for the development of the plan was placed on the War Plans Division of the General Staff, and a new branch of the division has been created to supervise this work.

Early in September a general order was issued defining the purposes and policies of education, and camp commanders were instructed to begin such instruction as was possible with the facilities available. As a result, schools are now in operation in 115 posts and, on the average, about 20 per cent of the men are voluntarily attending classes. A comprehensive plan for making effective instruction available for every man has been approved and is being put into effect as rapidly as possible.

Modern war requires soldiers who not only are trained to obey orders but who can act intelligently upon their own initiative in the many instances of modern war where this initiative on the part of the soldier is indispensable. Education for soldiers has been planned to develop their intelligent initiative as a necessary part of their training. The high percentage of technical specialists which the war showed to be necessary for modern armies will be developed by vocational education which will not only produce the necessary trained technicians for the service but will give the soldier a training which will enable him more readily upon his discharge to become a self-supporting citizen. Specific instructions in citizenship and American ideals is considered necessary to produce properly developed soldiers. The plan for the education of the soldier went into active operation November 1, 1919, and will be carried out according to the same high standards that have been insisted upon in the past in the military training and in the administration of the Army. Education has been made a definite part of army activity and will be stimulated, directed, and cared for according to the soundest and most enlightened methods which the educational experiences of the Nation can present.

MORALE WORK.

While the part that morale plays in any organization, military or otherwise, has always been recognized in the abstract, it was not until this war that its development and maintenance was made the subject of practical scientific study and application.

Although the German Armies had developed machinery to deal with morale, it was characteristic that they should have perverted its uses and relied upon falsehoods and trickery to build their own and weaken that of the enemy. Upon the latter they concentrated particularly.

In contradistinction to this method, there was created in the American Army an organization for the purpose of systematically studying conditions responsible for states of mind and behavior flowing therefrom and of applying honest methods of correction and stimulation.

The organization of this work, which finally culminated in the creation of a branch of the General Staff charged with the improvement of the efficiency of the soldier through the betterment of morale, was to a certain extent the natural outcome of the welfare work carried on by various organizations in which the morale element was a by-product; but this was carried out by them separately, usually uncoordinated and lacking any direct relation to military efficiency. But the scope of morale work went far beyond the field of activity of these agencies with every branch of the Army. The readjustment necessary was duplex, implying not only that of persons but of things. It pervaded the entire service. For this reason and in the light of European experience it was realized that maintenance of military morale was strictly a problem for solution by the Army itself.

Although the cessation of hostilities shortly after its creation gave the morale organization but little opportunity to function under war conditions, its work was changed and broadened to meet the needs of the readjustment period of demobilization, in which the ends were no less important. In this phase it is believed that morale work has played an effective part in allaying and removing many of the causes of discontent and difficulties which are usually attendant upon demobilization of large armies.

Morale work has now entered upon its application to the Regular Establishment and is being carried on at all organized divisions, posts, camps, and stations where appreciable numbers of officers and enlisted men are stationed. There morale officers act for commanders in respect to the spirit and mental attitude of men and officers and the degree of efficiency dependent thereon, just as other staff officers attend for the commander to more tangible details of his administration. One of the principal duties of such officers is to furnish the service with ideas which in practical experience have been found to be of value in maintaining the desired discipline and spirit.

In general, it may be said that the aims of morale work are first to have troops in such mental condition that they will be most receptive

to training in time of peace and to psychological stimulation in time of war, and, second, to render the Army as representative as may be of the standards and ideals of the country whose armed force it represents.

It may be noted that the Navy has instituted a morale organization which in many particulars follows the plan developed by the morale branch of the Army and that the idea of stimulation of spirit is also being applied to a constantly growing extent in industrial and commercial organizations.

WELFARE WORK FOR THE ARMY IN THE UNITED STATES.

Early in the war the President, through the Secretary of War and the Secretary of the Navy, organized the War and Navy Department Commissions on Training Camp Activities, for the purpose of coordinating, stimulating, and directing the welfare work for the officers and men in the service. The War Department Commission on Training Camp Activities invited the Young Men's Christian Association, Young Women's Christian Association, the National Catholic War Council, the American Library Association, the Salvation Army, the Jewish Welfare Board, and the War Camp Community Service to undertake such activities as were consistent with the exigencies of the service for the officers and the men in and around camps and posts.

In order to secure sufficient funds for this work, and in order that there might be no financial comparisons between the several organizations thus included, a united drive for funds was scheduled for the week of November 11, 1918, which, in spite of the signing of the armistice, resulted in the subscription of \$205,000,000, of which 58.65 per cent was given to the Young Men's Christian Association, 8.80 per cent to the Young Women's Christian Association, 17.60 per cent to the National Catholic War Council, 2.05 per cent to the American Library Association, 2.05 per cent to the Salvation Army, 2.05 per cent to the Jewish Welfare Board, and 8.80 per cent to the War Camp Community Service. With this money additional buildings were erected, equipment purchased, and secretaries hired for work in the United States, and vast sums of money were sent overseas for the care of the members of the American Expeditionary Forces.

The usual activities of these organizations included such entertainment as moving pictures, vaudeville shows, lectures, and musicians of extraordinary talent, facilities for hours of relaxation, indoor and outdoor games, writing material, religious activities, and, where necessity indicated, educational courses.

In addition to the supervision of the work of the seven affiliated organizations, the War Department Commission on Training Camp

Activities undertook to entertain the men by means of liberty theaters and their accompanying troops of performers, by amateur dramatic entertainments participated in by the talent found in the Army, and by motion pictures. The morale of the Army was greatly increased through the services of the Commission on Training Camp Activities song leaders who developed the so-called "singing regiments." The physical condition of the men was enhanced by a program of athletic sports and calisthenics which was planned to develop coordination of the mind and muscle to such a degree as would enable the soldier to carry on his duties as a fighter while at the same time it gave him diversion from the usual military and physical drill.

In order to carry out the promise of the Government that the young men of the country who went into the Army would be guarded from influences which might produce immoral habits and which would perhaps render them physically incapable of performing their duties as soldiers and citizens, the Commission on Training Camp Activities organized and supervised the law enforcement division, which, through channels of education, cooperation, and the actual enforcement of sections 12 and 13 of the selective-service act, succeeded to a remarkable degree in keeping the men of the service free from the temptation and resultant physical incapability offered by the prostitute and the degrading influences of liquor.

The activities of the Commission on Training Camp Activities were financed by congressional appropriation, private donations, and the Smileage Book campaign, which resulted in the sale of \$3,000,000 worth of coupons, which were purchased by the people and given to soldiers to be used as admissions to Liberty theaters.

The purpose of the Commission on Training Camp Activities and its seven affiliated organizations was to surround the men coming into the Army with as many of the usual comforts and luxuries as were possible under the circumstances. With that in mind, drafted men were received by some representative of the Commission when they entered their draft board, and were accompanied to training stations, on board transports, through their various stages of training in France, and, finally, in a number of instances, to battle. When men began to come back from overseas in large numbers, welfare workers were put on board the transports and remained there as a part of the personnel, giving the returning soldier as many of the creature comforts as seemed advisable, preparing him for the welcome he was to receive from his family and friends, and finally, and of more importance, encouraging his patriotic attitude toward the problem that lay before him in accommodating himself to changed conditions. Assistance was also given him in his quest for reemployment.

With the reduction of the Army to a peace-time basis the question of future welfare work in the Army was discussed by the Third Assistant Secretary of War in conference with many high ranking Regular Army officers, and a decision was reached in May to turn over at a convenient date all of the educational and welfare work to the Regular Army. This decision culminated in General Order No. 109, War Department, September 15, 1919, which established an education and recreation branch within the War Plans Division of the General Staff, charged with the responsibility of supervising and maintaining proper facilities for the education, recreation, and moral training of officers and men in the Military Establishment. Therefore, beginning November 1, 1919, such functions as have been carried on by the Commission on Training Camp Activities and the seven affiliated organizations will be the responsibility of the Army itself.

MILITARY JUSTICE.

The work done in the Office of the Judge Advocate General has of course greatly exceeded, both in importance and volume, its ordinary tasks. Its activities in the administration of military justice have been particularly under comment during the past year.

On April 6, 1917, the total number of prisoners in military prisons was 2,467 and 30 on parole; on the 1st day of November, 1919, the total number was 3,969 in prisons and 67 on parole. This means that although more than 4,000,000 men have been brought into the Army, the processes by which their delinquencies have been adjudicated and the ameliorations of discipline have resulted in a relatively small increase in the total number of prisoners. It remains a cause of lasting pride to the department that throughout the war not a single person was put to death for a purely military offense.

During the progress of the war, the operation of courts-martial led to great unevenness in the matter of penalties, and in some jurisdictions excessively severe sentences were imposed. This seemed at one time a matter of concern to the people of the country, who were not aware of the fact that practically all sentences imposed by military tribunals, whatever their apparent length in years of confinement, are indeterminate, the whole system of penal administration in the Army being built on the theory of restoration to honorable service, restoration taking effect as soon as an amendment of character is sufficiently noticeable to justify confidence in the restoration of the prisoner.

Immediately after the armistice boards of review were set up in the Office of the Judge Advocate General, which reviewed the records of all court-martial trials of persons still in confinement. This work is done, so far as trials occurring in the United States are concerned, and substantially completed as to trials occurring in

the American Expeditionary Forces. These boards of review have undertaken not only to equalize and moderate the penalties imposed, but also to recommend action by way of clemency with a view to wiping out, wherever possible, disabilities incurred by our young soldiers who found it impossible to conform to the rigid discipline and severe requirements of military service. An easy rule for the guidance of this action lay in a reversion to the peace-time limits for offenses established by order of the President as Commander in Chief. The application of these limits brought about the immediate restoration and honorable discharge of large numbers of young men.

Perhaps the most vexatious problem of military discipline was that affecting the so-called "conscientious objectors." Out of the whole number of persons professing "conscientious objection," only 504 were tried by courts-martial. The general results of the trials were as follows:

Tried by courts-martial.....	504
Acquitted.....	1
Convicted and sentenced.....	503
Disapproved:	
By reviewing authority.....	3
On the recommendation of the Judge Advocate General.....	50
Effective sentences.....	450

Thousands of young men whose religious, political, or humanitarian scruples prevented their accepting military service were given noncombatant service. Many of them found it possible later to accept the view of their fighting comrades, and some of the most conspicuous and gallant actions of the war were performed by men who at the outset found military service at variance with the dictates of their religious beliefs.

Of those who were actually tried and sentenced, a few were religious objectors. The term "conscientious objector" came to be applied more or less indiscriminately to persons who refused to serve in any capacity; some of them based their refusal upon political, and others upon social, grounds, so that the phrase as currently used includes all varieties of protestants against America's participation in the war. Some of them were frankly disloyal, some of them revolutionary, some of them probably evidencing little more than mental instability and nervous lesions. These cases have likewise been for the most part disposed of. Disposition was easy where the prisoners found it possible to accept the discipline of confinement and to conform to the rules established for the operation of military prisons. Where, however, men have refused to do even the necessary work of caring for the cleanliness of their own cells, or agitated mutinies and riots in

the prisons, they have complicated the problem of clemency and delayed their own restoration to civil life.

The problem has been, of course, novel to the United States, since we have never before had on any large scale to deal with the soldier brought into service by the compulsory process of law. That it was finally reduced to such small proportions is undoubtedly due to the wisdom of the regulations established by the President, offering alternatives to direct military service, and to the searching examinations into the individual cases made by the expert psychologists and criminologists who aided the department in seeking a just solution of the problem. The subject has been the occasion of much debate and agitation. It naturally appealed to the humane feelings of a portion of our people; but on the other hand, tolerance for the views of men whose conscience led them away from the dangers which their fellow citizens were called upon to face seemed to another part of our people faithlessness to those who did bear the perils of the war.

The War Department has acted on the principle that the defense of the country is a duty inherent in citizenship, and it has not sought to excuse those who declined to perform this duty, whatever the reason. On the other hand, our institutions are conceived in liberty of thought and action, and the War Department has not been either amazed or discouraged to find that here and there liberty has run riot with duty and produced individuals who put the accent in the wrong place and who prefer to be or to pose as martyrs, rather than perform the service so bravely and freely given by the great majority of the arms-bearing population of the country.

The number of cases of final recalcitrancy is remarkably small. That there may have been here and there instances of mistreatment of individual conscientious objectors on the one hand or too great tolerance for their views on the other, may perhaps be admitted as being inevitable, but the general solution of the problem has been most satisfactory. Our whole experience with the administration of military justice has led those most occupied with its administration to the belief that we may now safely proceed to incorporate into the Articles of War some modifications which will preserve for the future the lessons we have learned and make that body of law better adapted to deal in the future with the armies democratically raised and democratically organized upon which the country must always depend. These changes are not revolutionary, nor do they reflect seriously upon the Articles of War as they existed prior to April, 1917.

THE SETTLEMENT OF WAR CONTRACTS.

The termination of hostilities on November 11, 1918, found the War Department committed to a program for the supply of the Army on a tremendous scale. Requirements for munitions of every descrip-

tion had come to absorb a very large part of the productive capacity of the Nation. For many months, established industries, to an ever increasing degree, had diverted their existing facilities from ordinary lines of production to munition making, and had created large additional capacity solely for war purposes. Extensive new enterprises had sprung into being, many of them owned or financed, in whole or in part, by the Government. Everywhere the right of way was given to war orders. In the short course of the war the Government suddenly assumed unprecedented powers over private business and mobilized the industrial resources of the country. Through the War Industries Board the United States had come to exercise a vital control over the distribution of raw materials, the allocation of orders and priorities in transportation. The entire supply of certain commodities, such as wool, was taken over, and in steel, copper and other basic industries, prices were closely regulated. Fuel, food, exports and imports, were all subjected to similar control. The industrial life of the Nation was geared to high speed for production of the means to make war, and in all this the requirements of the War Department far exceeded the demands of other branches of the Government. Although we are but one year removed from the culmination of this great effort, we should not allow to fade from our minds the picture of America's industrial power diverted from its normal pursuits and throwing its tremendous weight into the war in support of our armed forces on land and sea.

At the height of this expansion and with almost no warning came the armistice. An immediate reversal of the procurement program became necessary, but the problem of applying the brakes without a disastrous jolt to the business life of the country involved serious difficulty. It was the plain duty of the United States, not only to protect its finances by reducing its expenditures for munitions no longer needed, but also to facilitate the transition to normal business conditions. In many lines large supplies had already been accumulated, which were now wholly superfluous. Numerous incomplete projects for still greater production could now be stopped. In other cases only a partial curtailment seemed advisable, pending demobilization.

Obviously, the interests of the country demanded that industry speedily return to its normal commercial channels; that labor and capital and the raw material be not continued to be converted into weapons of war, which happily were no longer needed. But how rapidly could this shift be made, particularly in view of the abnormal range of prices and the uncertainty which this created in the minds of every manufacturer in framing his new program? Moreover, there had been an actual physical change in the plants of the country by their conversion to war uses, and reconversion would involve

time and expense. There was a vast amount of raw material in many cases crowding these plants suited for war purposes, but unsuited for commercial production; a vast amount of material in process which could, with difficulty, be reconverted to the ordinary uses of industry. It was in every way an unprecedented situation. Neither manufacturers nor the department had any experience to guide them in attempting to work out a solution. Decisions had to be made promptly; there was no time for lengthy investigations or statistical studies. The immediate question before the department was how rapidly could it curtail production for which it had contracted without smashing the industrial machine and creating widespread unemployment.

Speaking generally, a tapering off policy was adopted so that plants would be largely cleared of work in process and the Government would not have on its hands enormous amounts of semifinished material, useful neither for the purposes of war nor for those of peace. The contracts of the War Department in which it was found desirable to curtail production called for a total expenditure, if they had been carried to completion, of upward of \$6,000,000,000. The department worked out its program of curtailment, so far as possible in cooperation with the manufacturers affected, with the War Industries Board and representatives of the Department of Labor. Manufacturers affected accepted this program and took up the task of the shift back to commercial work with courage and initiative. They could not see ahead, but they went ahead. Thanks to this spirit, in the main the shift back from war industry to commercial work was effected with a maximum of speed and without widespread hardship or distress.

The program for the curtailment of production having been determined, the department found itself, as a result, face to face with a second task of importance and difficulty. The curtailment of production under outstanding contracts necessitated the adjustment of the rights of the contractor under his contract. If the Government had flatly canceled the contracts, the contractor would have had no recourse but to the Court of Claims for the damages sustained by him through the action of the Government. The burden imposed upon that court of trying out the multitude of difficult and intricate cases involved would have not only necessarily imposed a long delay in the settlement of these cases but also the hardship on the contractor of having the examination made and decision reached by those entirely unfamiliar with the history of the contract.

It was determined not to cancel contracts but to suspend temporarily or curtail their operation, pending the negotiation between the department and the contractor of a supplemental contract which

would provide for the curtailment of production and the final adjustment of the relations between the contractor and the Government. The contractors, generally, cooperated in this procedure and accepted the temporary suspensions and curtailments at the request of the department. The work of negotiation of final adjustment was then undertaken.

It was important that the department should deal with contractors, generally, on the same basis. The basis adopted is a simple one to state. First, all articles which are completed under the contract are paid for on the terms provided for by the contract. Second, where the contractor has made expenditures and incurred obligations which do not result in finished products, then the Government reimburses him for his expenditures, protects him in his obligations to subcontractors, and in addition pays him a remuneration for the use of his capital and services which have not resulted in completed products. To state this basis of settlement in more detail, the method pursued is substantially as follows: The contractor is reimbursed for the raw material which he has purchased for the purposes of the contract and is paid interest for the use of his capital which is tied up in that raw material. He is reimbursed for his expenditures on work in process, and in addition, he is paid remuneration up to 10 per cent of the cost for the use of his services and capital on that work in process. If he has subcontracts he is reimbursed the amount which he is obliged to pay subcontractors in settlement of his obligations to them growing out of the curtailment of production under the prime contract. If, in carrying out his contract, he has provided facilities for that contract and in estimating his price has taken the amortization of those facilities into consideration as an element of price, he is allowed that part of the cost of the facilities he would have recouped if the contract had gone to completion. This is the ordinary basis of settlement to a contractor. It is recognized, however, that there may be special elements in a particular contract which prevent a settlement on this basis from affording to the contractor fair and just compensation for what he has done, and in such cases provision is made for additional compensation.

No provision was made in this basis of settlement for the allowance of prospective profits. This was for two reasons: First, it has been the general feeling among contractors that they did not desire to claim profits from the United States for work which they had not performed for the United States and could not perform by reason of the termination of hostilities. Second, if there be a legal claim for prospective profits, it is a claim involving difficult questions of fact and of law which the administrative machinery of the War Department is not adapted to handle. Contractors who feel they have a

right to, and desire to, claim prospective profits can have their rights properly adjudicated in the Court of Claims, but it has been the experience of the department that contractors the country over feel that reimbursement for expenditures made, with some remuneration for the use of their capital and their services in work which had not resulted in completed articles by reason of the suspension of production, furnishes a basis of settlement by the Government which is fair and which they are entirely willing to accept.

An elaborate organization has grown up within the department, energetically engaged in adjusting the postwar contractual relations with private industry. The goal of this effort has been twofold—first, to protect the interests of the United States, and, second, to reach the quickest possible adjustment in each case, realizing that many of the contractors could ill afford to allow large amounts of working capital to remain tied up in unproductive work. Following the armistice, each supply bureau created a board to review outstanding contracts and to assist in determining the extent of curtailment. These boards naturally assumed the duty of negotiating settlement agreements wherever suspensions took place.

In January of the present year there was established the War Department claims board, with authority "to supervise and coordinate the work of the various War Department agencies engaged in the settlement of claims resulting from the termination of contracts or other procurement obligations of the department consequent upon the suspension of hostilities, and to authorize and approve such settlements." The president of this board is the Assistant Secretary of War, who, as Director of Munitions, is in immediate charge of all the procurement activities of the Army. Special members are designated for each of the several bureaus, to coordinate the work of the bureau claims board. While general supervision was thus established, the actual work of negotiating settlements was decentralized in the larger bureaus by the creation of district or zone boards, established at business centers throughout the country.

Thus, in a normal instance, the contractor presents his case to the nearest local board of the proper bureau and arrives at a basis of settlement. Reduced to the form of a supplemental contract, this agreement is forwarded to the bureau board in Washington for its analysis and approval and for final sanction by a member of the War Department claims board. In cases in which neither the local nor the bureau board is able to arrive at an agreement with the contractor, an appeal is allowed to the Board of Contract Adjustment. This board was established shortly before the armistice, to represent the Secretary in the solution of doubts, claims, and disputes arising from contracts then in the course of performance. With the change of conditions it continued to act in difficult cases resulting from the

suspension of contracts and informal agreements. It is composed of experienced lawyers, many of them drawn directly from civil life, who are contributing valuable service in the solution of the legal problems consequent upon the novel relations assumed by the Government toward private business during the war.

Mention should also be made of the War Department board of appraisers. This body was originally organized during the war to determine just compensation for real estate and various commodities requisitioned for military purposes. In addition, it has been assigned the settlement of an important class of terminated agreements, for the acquisition of land or interests therein.

The organization thus outlined includes 42 different boards and has required the employment of a very large personnel, who have earnestly endeavored to meet contractors in a spirit of fairness and provide compensation as rapidly as possible, consistent with the interests of the United States.

Soon after the armistice, a situation developed which for a time threatened to do substantial injustice to a large number of business concerns which had entered upon production for the Government without awaiting the execution of a formal contract. The Comptroller of the Treasury ruled that the law forbade the payment of any compensation for the uncompleted portion of a terminated agreement which was not reduced to written contract in the form prescribed by statute. In many cases the necessity for immediate production had led patriotic business men to make large expenditures based on verbal agreements or correspondence with procurement officers, in the full confidence that formal contracts would follow. In other instances, technical defects developed in supposedly valid instruments. Following the general suspension of work under these informal agreements, the United States found itself, for the time being, without authority of law to adjust its plain business obligations. This situation was presented to the Congress, which responded by the passage of the so-called Dent Act, approved March 2, 1919. This remedial act gave to the Secretary of War broad powers to adjust any agreement, express or implied, entered into for the prosecution of the war, prior to November 12, 1918, and not executed in the manner prescribed by law, with the limitation that prospective profits, other than a reasonable remuneration for work done and expenditures made which did not result in completed products, should not be allowed. The Court of Claims was given jurisdiction to review those cases in which the action of the Secretary proved unacceptable to the claimants.

At the time this act passed the War Department claims board had already assumed supervision over the settlement of all properly executed contracts, and accordingly I deemed it best to delegate to the same board the execution of the new legislation, so far as related

to agreements made within the United States and with its citizens. The War Department claims board thereupon formulated procedure under which claimants presented their cases to the bureau boards already established, or to the Board of Contract Adjustment if the terms of the agreement had not been reduced to writing in any form. The boards were instructed first to establish under their certificates the provisions of the agreements, and then to proceed to a fair and equitable adjustment in each case. The resulting awards are negotiated by the district or zone boards and executed by the bureau boards, subject in all cases to the approval of a member of the War Department claims board. The act of March 2, 1919, thus made possible the satisfaction of many just claims, to the substantial relief of business.

A year has now passed since this department was confronted with the sudden reversal of its military supply problem and the readjustment of its relations to private industry. The task is not yet complete; many of the more difficult and larger settlements remain to be completed, but the greater part has been performed. The following figures as of November 1, 1919, will convey an idea of the progress made:

Total number of contracts and agreements necessitating settlement.	24,988
Contracts and agreements settled and adjusted.....	22,596
Uncompleted portion of contracts and agreements already settled.	\$2,091,435,426.50
Amount approved for payment in final settlement of contracts and agreements already completely adjusted.....	\$252,160,382.42
Amount already approved for payment in partial settlement of contracts and agreements not yet completely adjusted.....	\$78,942,212.70
Per cent of amount paid or approved for payment in final settlement to uncompleted portions of contracts and agreements settled.....	12.5

In addition, there are approximately 2,700 claims pending, based on alleged agreements not yet recognized by the department as coming within the Dent Act.

In other words, thus far settlement has been made on the basis of $12\frac{1}{2}$ cents for every additional dollar that would have been expended if the terminated contracts had been completely performed. A further reduction of this figure may be expected by the ultimate credit thereto of the amounts realized from the sale of material taken over by the United States as a part of the settlements.

It is proper at this time to express to the contractors with whom the Government has negotiated appreciation of the prevailing spirit of cooperation in furnishing desired information and of toleration for the occasional annoying delays incident to so complicated an undertaking. Although the claims as presented have frequently been cut to substantially lower figures, it remains true that deliberate attempts to impose upon the Government have been notably few. In fact, it may be said that the fine industrial morale devel-

oped during the war has continued into the transition period, and has supported the efforts of the War Department to ascertain and liquidate its obligations in the shortest possible time.

When it is remembered that claims growing out of the Civil War and even out of earlier wars are still in course of litigation, or settlement through legislative action, it will be realized how much has been accomplished in the single year which has elapsed since the termination of hostilities. Obviously, the number of contracts, the amounts involved, the variety and novelty of questions raised, all immeasurably exceeded the ordinary business transactions of the Government. Perhaps the principal embarrassment in getting forward with this task has been the necessary changes of personnel from time to time. Officers and civilians who were in the service during the war were often unable to remain without unjustifiable sacrifice, and in many cases it was not desirable that they should remain, since they were key men in important industries, the resumption of which was of the highest national importance. Accordingly, arrangements had to be made to release both those who could not stay and those who ought not to stay; but this deprived the Government of the services of many who had been instrumental in making contracts and in carrying them partially to execution, and who, therefore, were most intimately acquainted with the negotiations preceding the contracts and the modifications in them as the result of experience and operation.

There was, however, a very general realization on the part of all the officers, regular and emergency, in the several supply bureaus, of the fact that the resumption of business in the United States could only be brought about by the completed adjustment of these contracts and the release to normal channels of trade of the capital tied up in the claims of industrial concerns against the Government. Many industries had their entire working capital invested in the claims, and until they were paid, or their claims at least liquidated, it was impossible to proceed with the execution of peace-time orders which began to present themselves. This realization to the business man was a call to further sacrifice for the common good, and there have been throughout the year, and still are, large numbers of men in the service of the Government foregoing assured rewards in private business in order that they may see this thing through and aid in the restoration of a settled and safe industrial condition in the country.

LIQUIDATION OF INTERNATIONAL OBLIGATIONS.

Reference has been made above to the extensive purchases of war supplies in this country by our European allies, and also to the pooling arrangements which were later made, whereby the United States undertook to supply out of its resources certain of the needs

of all the Allies, and they in turn out of their resources undertook to supply us and our Army with things which they were specially equipped to produce speedily and economically. In general, the policy was adopted of placing orders through the Government of the country in which the supplies were to be produced. Orders for artillery for the American forces were placed through the French Government with French manufacturers; orders for toluol for France were placed through the Government of the United States. This method was not exclusive, and contracts were frequently made with the nationals of another government; always, however, under such supervision as to prevent competition or interference with the general system of interallied supply.

Frequently the articles to be supplied were of such novelty or intricacy that no definite price could be fixed in advance; as, for instance, when it became apparent that the allied need for nitro-cellulose powder required the construction of new manufacturing plants, the United States undertook to build the two great factories at Nitro, W. Va., and Old Hickory, Tenn., on the more or less general understanding that they were to be a common source of supply. In the same way, services were performed by each of the nations for the other.

Reference has already been made to the transportation of American troops and cargo in British bottoms, and the transportation of American troops and supplies on French railroads. These movements were too hurried and too extensive to permit the accurate accounting and predetermination of costs which are customary in normal times. In general, the principle was agreed upon that these supplies and services should be furnished by each nation without profit to itself and on equal terms to itself and its associates.

When the armistice came there were necessarily outstanding claims of all sorts for services and supplies among the several nations; sometimes directly between the War Department and the ministry of munitions of France or England, sometimes between the services of supply of the American Expeditionary Forces and individuals or corporations in France, England, or Italy, and sometimes in this country between the War Department and the supply bureaus and war offices of our European associates. The intricacy of these was such that no adequate comprehension of them could be had without painstaking examination of reports covering volumes and requiring for their understanding technical knowledge ranging over the whole field of industry as applied to war. Immediately upon the conclusion of the armistice, the necessity for a liquidation of these claims became apparent. With the President's approval, two agencies were set up for the purpose. The most important of these was the United States Liquidation Commission—War Department. The commis-

sion was composed of Judge Edwin B. Parker, Mr. H. H. Johnson, Hon. Henry F. Hollis, and Brig. Gen. Charles G. Dawes, general purchasing agent of the American Expeditionary Forces in France.

The other agency was a special representative of the Secretary of War to undertake the liquidation of such matters in the United States. In this latter task I was fortunate to have the services of Mr. Chester W. Cuthell.

In general, the work of these agencies was to file on behalf of the United States all claims against European governments and nationals and to receive and settle all claims by European governments and nationals against the United States growing out of the operations of the War Department. The settlement was to take the form of a liquidation, reducing practically to a general balance sheet the reciprocal agreed indebtedness as between the United States and England, the United States and France, and the United States and Italy, striking a balance and determining the net obligation of the debt nation or individual in each instance.

SALES ABROAD.

Attached to this report will be found a preliminary report by Judge Edwin B. Parker, chairman of the United States Liquidation Commission—War Department. Any summary comment upon so extraordinary a piece of work as that done by Judge Parker and his associates in France would be inadequate.

The United States Liquidation Commission was, of course, not created as a sales agency, but the withdrawal of the American Expeditionary Forces made it clear that the disposal of the great accumulations of property in France had to be pushed rapidly and was in reality tied up with the liquidation of claims by and against the American Expeditionary Forces in their relations with European Governments and nationals. I therefore asked the Liquidation Commission to undertake the task of disposing of these stores.

The stores to be disposed of were located all over France, in many places in England, and occupied German territory. They consisted of fixed works such as docks, warehouses, refrigerating plants, power plants, repair shops, manufacturing establishments, additions to trackage, bridges and other railroad facilities, telegraph and telephone lines and exchanges, and even more extensive forms of movable property, including practically every kind of equipment and supplies used by an army operating at a place remote from its base. These movable supplies included railroad engines, cars, cranes, special appliances built in the United States and adapted to European gauge, motor transport equipment in all stages of preservation and repair, from that practically worn out to the new equipment in storage warehouses not yet assembled; machine tools collected for

repairing ordnance, motor transport, airplanes, and Signal Service equipment; clothing, new and salvaged; and foodstuffs, often in containers of special construction and size, packed for overseas transportation but not in a form for ready retail commercial disposition.

Only a small part of these vast forms of property could be returned to the United States. Tonnage preference was given to the return of ordnance matériel and of selected items of property especially needed in the United States; but the great bulk of it remained to be disposed of, and the commission faced a situation in which there was a certain competition for some portions of these supplies among the recently liberated European nations and an inability on their part to supply ready money for the purchases. It adopted for the guidance of the commission the general policy that it was wiser to dispose of these materials in Europe than to attempt to store them until tonnage facilities could be provided for their return to the United States. A vast army of custodians would have been required to have been retained in Europe to guard the supplies, and they were estimated to be deteriorating at a daily rate of about half a million dollars by perfectly natural processes. The full capacity of the French railroad systems was needed for the restoration of French industry, and the transportation of these supplies to the coast for reshipment to America could not have been undertaken on any large scale for a long time.

On the other hand, if the War Department had undertaken to sell these supplies at retail, either to individuals or in large bulk by competitive bids, questions of import duties would have been raised and embarrassing competitions with French industry and commerce would have arisen with possibilities of either serious consequences to the attempt of the French people to restore their own industrial and commercial undertakings to normal, or else intervention by the public authorities of France which would have further delayed disposition of the property. It seemed wiser, on every ground, to transfer this property to the French Government in bulk, if an arrangement could be made to do so at a fair price, thus bringing about the immediate substitution of French custody for American custody, releasing our Services of Supply troops for early return to America, obviating the necessity of establishing an intricate, costly, and extensive sales organization in Europe, and transferring to the public authorities of France the opportunity of disposing of these materials so that they could be applied without disturbance to the needs of their people.

Out of the entire bulk of supplies, some sales were made to various European nations on terms of credit, and under the authority of Congress our surplus medical and surgical supplies in Europe were

turned over to the American Red Cross for use in its European relief work. The residue was happily sold to the French Government for about four hundred million dollars, an arrangement obviously advantageous both to France and the United States.

As to the sufficiency of the price obtained for these supplies, opinions may of course differ. The more I have studied the sale, the more satisfied I have become that it was wise and just. It had the added advantage of closing up a most difficult international question to the mutual satisfaction of the two nations involved, and may fitly be characterized as a work wrought by statesmen as well as a prudent conservation of the property interests of the United States.

SETTLEMENT OF CLAIMS IN THE UNITED STATES.

On the 22d day of January, 1919, I appointed Mr. Chester W. Cuthell special representative of the Secretary of War, with authority to liquidate, under my direction, the relations of the War Department to the several Governments of the European Allies growing out of orders, purchases, and engagements arising in the procurement of munitions, services, and supplies in this country by such European Allies. I attach hereto, as an appendix to this report, a complete statement of the work done by Mr. Cuthell and his associates.

The intention was that the reciprocal claims existing in this country should be worked out and the balance transmitted to the United States Liquidation Commission, War Department, in Paris, there to be entered into the general balance sheets exhibiting the international indebtedness, and to become part of the set-off system by which an ultimate set-off balance in each instance was to be derived. The original expenditures, both for the work of Mr. Cuthell and that of the United States Liquidation Commission, War Department, Paris, was out of funds set aside by the President out of the general appropriation for the national security and defense, and the total amount expended under Mr. Cuthell's direction amounted to \$172,625. The total collections, or balance due the War Department as arranged by Mr. Cuthell, aggregated \$319,464,229. The expense of collection was, therefore, roughly one-eighteenth of 1 per cent of the total amount collected.

The work involved, in this series of settlements, such matters as Liberty engines, nitrocellulose powder, picric acid, cotton linters, and a vast variety of less important and less intricate items. They were worked out in negotiation with representatives of the respective European Governments stationed in the United States, or with the ministries of supplies of these Governments directly by Mr. Cuthell on visits to Europe.

That any such an amount could be adjusted to the mutual satisfaction of all concerned, and approved by the respective Governments,

leaving no unsettled claim to disturb the harmony of our international relations or to drag through a long period of diplomatic negotiation or adjudication, is an occasion of great satisfaction; and that all of these obligations should have been thus adjusted within less than a year is evidence at once of the zeal and earnestness with which Mr. Cuthell and his associates entered upon the task and also of the cooperative spirit in which the heads of the great supply departments of our Allied Governments associated themselves in this effort to clean up and liquidate all outstanding differences. As Mr. Cuthell remarks in his report, in point of money involved these settlements are greater than all of the other international settlements made by our country added together.

LIQUIDATION ABROAD.

The United States Liquidation Commission—War Department, has substantially completed its work. Gen. Dawes, Senator Hollis, and Mr. Johnson have retired from membership and Judge Parker will sail from France with the records in about two weeks. A full and comprehensive report of all the work done will be submitted and published as a separate document, both because of its great historical importance and because of the usefulness of the information to citizens, to the Congress, and the executive departments of the Government.

Representatives of the Treasury Department have been in constant association with the Commission. Mr. E. R. Stettinius, formerly Second Assistant Secretary of War, has also been very generous in aiding the commission with the intimate knowledge he has upon many subjects of international negotiation and contract affecting war supplies.

Many of the items covered in the general balance sheet were, of course, worked out here through the organization of Mr. Cuthell, or by Gen. Pershing's staff in Europe. The very large question of rates for ocean transportation of men and cargo was worked out by Brig. Gen. Frank T. Hines, Chief of the Transportation Service of the General Staff, whose brilliant services in the whole matter of transportation deserve special recognition. The settlements and agreements effected through these agencies were all reported to the Liquidation Commission. The vast bulk of claims, however, remained to be negotiated through the commission itself. They covered not only prearmistice but postarmistice claims, and included practically all claims by and against the War Department for the operations of our armies in the allied countries. The bulk of these transactions can not yet be definitely stated because the final casting of accounts is still in process. It is safe, however, to say that the foreign settle-

ments aggregate a larger sum than those effected in the United States, and the gross claims reciprocally stated dealt with by the commission undoubtedly exceeded seven hundred and fifty million dollars.

Less than a year has been occupied in carrying out these transactions. They are unprecedented in magnitude, either in the international business experiences of men, or in international relations. The costs involved are greater than the annual revenues of empires; the possibilities of international misunderstanding were, of course, limitless. That a satisfactory adjustment has been reached is due alike to the spirit in which our allies approached the subject and the infinite tact, business judgment, and zeal with which Judge Parker and his associates addressed themselves to the problem.

In the excitement of war we found a superb response from men of affairs everywhere who unselfishly set aside their personal concerns in order that they might serve; in the great task of clearing out the war's aftermath the same spirit has been shown. Judge Parker and his associates, Mr. Cuthell and his associates, have deferred their business opportunities and prolonged the neglect of their own affairs in order that they might render services less conspicuous than those of the battle field, but as permanent and valuable in the protection of the good name of the United States and in the perpetuation of sound and amicable relations among the great civilized powers who were associated in the war for civilization.

SALE OF MATERIALS.

When the armistice was signed, the War Department was immediately confronted with the task of disposing of the enormous amount of property purchased for war activities, which would no longer be needed.

The best figures obtainable showed that there was for disposal in this country property which cost the War Department in excess of \$2,000,000,000, and in Europe in excess of \$1,680,500,000.

Under the act of July 9, 1918, making appropriations for the support of the Army for the fiscal year ending June 30, 1919, on the subject of "Sale of war supplies," authorization was granted for the sale, under such terms as were deemed expedient, of property acquired during the emergency. Pursuant to this act, Mr. Crowell, the Assistant Secretary of War, was made responsible for the disposal of the surplus property in the United States; and by his direction a branch of the Purchase, Storage and Traffic Division, known as the sales branch, was set up in December, 1918, under Brig. Gen. C. C. Jamieson, as Director of Sales. Gen. Jamieson was obliged to give up these activities owing to ill health, and Mr. C. W. Hare was appointed Director of Sales on January 7, 1919. Owing to the state of his health, Mr. Hare tendered his resignation on October 21, 1919,

and Mr. E. C. Morse, formerly First Assistant Director of Sales, has been appointed to succeed him.

The problem confronting the Director of Sales was the disposal of the property accumulated in this country, at a time when general industrial conditions were in a chaotic state, in such a way as not to unnecessarily disturb industrial conditions and at the same time realize the maximum return to the Treasury. Producers were endeavoring to get back to a peace-time basis, after working almost entirely on war orders. There was at the time a large percentage of unemployed labor which was being, or was about to be, increased by the demobilization of about four and a half million soldiers and sailors. Late in the spring it was seen that conditions were becoming more stabilized, and producers and labor resumed activities. From then on less thought was given to this aspect and efforts were made by the War Department to put into the hands of the consumer such surplus as subsistence and clothing at reasonable prices, so as to assist as much as possible in reducing the high cost of living.

In order effectively to dispose of this surplus property, it was of course necessary to know the amount of material available for sale, and its location and condition. Very great difficulties, however, have embarrassed the determination of these questions. First, the rate at which our over-seas forces could be returned and demobilized could not be foreseen with accuracy, and the quantities of stores needed for their maintenance until demobilized was therefore uncertain. Second, the size of the Army to be maintained until the declaration of peace and thereafter could not be foreseen, since both questions lay in an uncertain region affected from day to day by changing conditions. Third, the demobilization of the personnel familiar with the material necessitated the substitution of civilian caretakers to whom the stock was unknown, and the very bulk of the supplies was such as to render an inventory impracticable, particularly in view of the fact that the demobilizing army was still consuming stores while the industry of the country, at a slackening rate, was still pouring additional supplies into the stocks, as the result of the tapering-off operations of war contracts. Fourth, a great volume of supplies in Europe, which had been accumulated there for the use of the Army, remained undisposed of, and there had constantly to be considered the possibility of profitably returning at least portions of those supplies to the United States, a possibility which had to be balanced against the national advantage of other uses for the ocean tonnage required in reestablishing interrupted lines of world trade.

In spite of these handicaps, and under the supervision and direction of the office of the Director of Sales, the bureaus of the War Department proceeded with the disposition of surplus property, and to date public sales and transfers with funds to other Government depart-

ments have been made of property which cost the Government \$596,000,000, on which a return of 76 per cent, or \$453,000,000, has been realized.

In addition to the above, transfers without funds have been made, under acts of the Congress, to the Post Office Department, the Treasury Department (Public Health Service), and the Department of Agriculture (Bureau of Public Roads). The property so transferred to date cost the War Department \$66,000,000.

Contracts have been entered into, extending over a considerable period of time, for property aggregating \$90,000,000 cost to the Government, on which it is estimated a return of 50 per cent, or \$45,000,000, will be realized by the War Department.

In all sales involving leased land, wherever possible, the sale was made with the condition that the purchaser would assume all damage or other claims. The amount saved in this manner is unknown, but runs into the millions of dollars.

There were also reported to Congress, as of December 2, 1918, sales to the amount of \$123,000,000, made under the act heretofore mentioned prior to the establishment of the office of the Director of Sales.

The War Department has, therefore, disposed of property purchased for the prosecution of the war, and physically in the United States, aggregating in cost \$902,000,000, at a total return to the War Department of \$687,000,000, including transfers without funds, or a return of 75.3 per cent.

It is estimated that nearly one-half of the total surplus property held by the War Department in the United States at the signing of the armistice has been disposed of.

The surplus property abroad was disposed of through the United States Liquidation Commission for approximately \$627,000,000, of which amount \$400,000,000 represents sale to the French Government. It should be borne in mind, however, that the cost of property acquired abroad was excessive and that the present replacement value of this property is estimated at \$1,000,000,000, thus giving a return of 62.7 per cent.

Summarizing the above figures, it appears that an estimate of the total surplus property held by the War Department, both here and abroad, amounted in round figures to \$3,700,000,000, of which amount \$2,582,000,000 has been disposed of, giving a return of \$1,314,000,000 to the War Department, or a recovery of 51 per cent based on the ratio of return to cost.

Report in connection with sales of material.

IN UNITED STATES.

	Cost to Gov- ernment.	Recovery.	Percent- age.
Sales and transfers with funds.....	\$596,000,000	\$453,000,000	76.0
Transfers without funds.....	66,000,000	66,000,000	100.0
Contracts not reported as sales to date.....	90,000,000	45,000,000	50.0
Old sales, per report of Dec. 2, 1918.....	¹ 150,000,000	123,000,000	82.0
Total.....	902,000,000	687,000,000	75.3

¹ Estimated.

OVERSEAS.

	Cost.	Replacement.	Recovery.	Per cent of recovery to cost.	Per cent of recovery to replace- ment.
French sales.....	\$1,400,000,000	\$800,000,000	\$400,000,000	28.0	50
Third Army material.....	100,000,000	60,000,000	46,650,000	47.0	77
Poland.....	50,000,000	.....	50,000,000	100.0	.....
Spain.....	5,500,000	.....	5,500,000	100.0	.....
Belgium.....	25,000,000	.....	25,000,000	100.0	.....
Miscellaneous.....	100,000,000	.....	100,000,000	100.0	.....
Total.....	1,680,500,000	.....	627,150,000	37.3	.....

PERMANENT MILITARY POLICY.

The act of February 2, 1901, fixed the maximum enlisted strength of the line of the Army at 100,000. The national-defense act, approved June 3, 1916, authorized the increase of this strength by five annual increments to a final maximum of 175,000, exclusive of the staff departments, Philippine Scouts, and unassigned recruits. The present authorized enlisted strength of the staff departments and unassigned recruits, exclusive of Philippine Scouts, is 47,917. The officers authorized for these forces number 11,462, making an aggregate authorized enlisted strength of 222,917 and a total strength of 234,379 to be reached by June, 1921.

The national-defense act also provided for the federalization of the National Guard, and contemplated in this manner the creation of a force with an ultimate strength of 442,800 men and officers, trained in the several States and so apportioned that when assembled at the call of the Government it would constitute 16 divisions containing the same arms and organizations provided for divisions of the Regular Army. The President was authorized in the event of an emergency to put into immediate effect the increases called for by the five annual increments. In both the Regular Army and the National Guard a system of minimum strengths was provided, it being recognized that under normal conditions recruitment would

probably not bring either the Regular Army or the National Guard to full authorized strength. The Regular Army was scattered over the continental United States and in the insular possessions, occupying posts built for the accommodation of companies, battalions, regiments, and brigades; and the National Guard, of course, consisted of citizens carrying on their ordinary civilian occupations, centering their assembly for instruction and drill about their armories and drill fields throughout the country.

At the time of the passage of the national-defense act the strength of the Regular Army was about 94,600 men and 4,725 officers, and that of the National Guard 123,600 men and 8,590 officers. Immediately after the passage of the act there arose the emergency on the Mexican frontier caused by the Villa raid. A substantial part of the Regular Army then in the United States was concentrated along the border, and shortly thereafter the National Guard was called into the Federal service and sent to the border. Immediate efforts were made to recruit both forces, the number of troops on the border reaching a maximum by the end of August, at which time they totaled 160,000 officers and men, of whom nearly 112,000 were National Guard troops. The termination of this emergency was almost coincident with the mobilization necessary for participation in the World War, and both the Regular Army and National Guard were strengthened by voluntary enlistments. Later both forces were strengthened by men brought in under the operation of the selective-service law, and during active operations replacements for all forces were largely from that source.

At the beginning of April, 1917, the actual strength of our organized military forces in Federal service was as follows:

	Officers.	Men.	Total.
Regular Army.....	5,791	121,797	127,588
National Guard.....	3,199	76,713	79,912
Total.....	8,990	198,510	207,500

In addition there were 97,295 enlisted men in the National Guard not in Federal service.

The passage of the selective-service law did not automatically suspend the opportunity for volunteering. The character of the conflict, however, and the industrial necessities of the country made it clear from the outset that the power to determine whether a man was more needed in the military service or in industry ought to rest with the Government, and that it was wasteful, if not dangerous, to allow the patriotic impulses of skilled workers in vital trades to cripple the productive capacity of the country, upon which the

supply of our own Army as well as the military and civil needs of our allies depended. The War Department did not, therefore, actively encourage volunteering and inaugurated no campaigns to secure volunteers, although in deference to the will of the Congress, as expressed in early war legislation, the opportunity was not closed.

This led to an Army theoretically drawn from three sources: The Regular Army, composed of men volunteering for fixed terms of enlistment, without regard to the duration of the war; the National Guard, drafted into the Federal service, and thus, so far as its obligation was concerned, a Federal force, secured by draft but preserving the characteristics of a force of volunteers organized in localities and neighborhoods, and at least having the traditions of State origin; and the so-called National Army, the members of which were selected by draft for the duration of the war, and organized without controlling reference to the State or locality from which the men were drawn.

The plan provided for the organization of 20 divisions of the Regular Army, numbered, respectively, from 1 to 20; 17 divisions of the National Guard, numbered, respectively, from 26 to 42, and such number of National Army divisions as should be required, numbered consecutively from 76 upward. Twenty Regular Army divisions were in fact authorized; of them 7 entire divisions were organized and transported overseas, besides 10,131 men of the Eighth and advance detachments of the Tenth, Eleventh, and Twelfth Divisions, and at the time of the armistice the balance of the 20 divisions were in process of organization and training in this country. All of the National Guard divisions reached France, and the National Army divisions from the Seventy-sixth to the Ninety-second, inclusive, reached France. The following table shows the divisions divided into the three groups and indicates the camps at which they were trained and the States from which they were drawn:

Division.	Camp.	States from which drawn.
Regulars:		
First.....	France.....	Regulars.
Second.....	do.....	Do.
Third.....	Greene, N. C.....	Do.
Fourth.....	do.....	Do.
Fifth.....	Logan, Tex.....	Do.
Sixth.....	McClellan, Ala.....	Do.
Seventh.....	MacArthur, Tex.....	Do.
Eighth.....	Fremont, Calif.....	Do.
Ninth.....	Sheridan, Ala.....	Do.
Tenth.....	Funston, Kans.....	Do.
Eleventh.....	Meade, Md.....	Do.
Twelfth.....	Devens, Mass.....	Do.
Thirteenth.....	Lewis, Wash.....	Do.
Fourteenth.....	Custer, Mich.....	Do.
Fifteenth.....	Logan, Tex.....	Do.
Sixteenth.....	Kearny, Calif.....	Do.
Seventeenth.....	Beauregard, La.....	Do.
Eighteenth.....	Travis, Tex.....	Do.
Nineteenth.....	Dodge, Iowa.....	Do.
Twentieth.....	Sevier, S. C.....	Do.

Division.	Camp.	States from which drawn.
National Guard:		
Twenty-sixth.....	Devens, Mass.....	New England.
Twenty-seventh.....	Wadsworth, S. C.....	New York.
Twenty-eighth.....	Hancock, Ga.....	Pennsylvania.
Twenty-ninth.....	McClellan, Ala.....	New Jersey, Delaware, Virginia, Maryland, District of Columbia.
Thirtieth.....	Sevier, S. C.....	Tennessee, North Carolina, South Carolina, District of Columbia.
Thirty-first.....	Wheeler, Ga.....	Georgia, Alabama, Florida.
Thirty-second.....	MacArthur, Tex.....	Michigan, Wisconsin.
Thirty-third.....	Logan, Tex.....	Illinois.
Thirty-fourth.....	Cody, N. Mex.....	Nebraska, Iowa, South Dakota, Minnesota.
Thirty-fifth.....	Doniphan, Okla.....	Missouri, Kansas.
Thirty-sixth.....	Bowie, Tex.....	Texas, Oklahoma.
Thirty-seventh.....	Sheridan, Ala.....	Ohio.
Thirty-eighth.....	Shelby, Miss.....	Indiana, Kentucky, West Virginia.
Thirty-ninth.....	Beauregard, La.....	Alabama, Mississippi, Louisiana.
Fortieth.....	Kearny, Calif.....	California, Colorado, Utah, Arizona, New Mexico.
Forty-first.....	Fremont, Calif.....	Washington, Oregon, Montana, Idaho, Wyoming.
Forty-second.....	Mills, N. Y.....	Various States.
National Army:		
Seventy-sixth.....	Devens, Mass.....	New England, New York.
Seventy-seventh.....	Upton, N. Y.....	New York City.
Seventy-eighth.....	Dix, N. J.....	Western New York, New Jersey, Delaware.
Seventy-ninth.....	Meade, Md.....	Northeastern Pennsylvania, Maryland, District of Columbia.
Eightieth.....	Lee, Va.....	Virginia, West Virginia, western Pennsylvania.
Eighty-first.....	Jackson, S. C.....	North Carolina, South Carolina, Florida, Porto Rico.
Eighty-second.....	Gordon, Ga.....	Georgia, Alabama, Tennessee.
Eighty-third.....	Sherman, Ohio.....	Ohio, western Pennsylvania.
Eighty-fourth.....	Zachary Taylor, Ky.....	Kentucky, Indiana, southern Illinois.
Eighty-fifth.....	Custer, Mich.....	Michigan, eastern Wisconsin.
Eighty-sixth.....	Grant, Ill.....	Chicago, northern Illinois.
Eighty-seventh.....	Pike, Ark.....	Arkansas, Louisiana, Mississippi, southern Alabama.
Eighty-eighth.....	Dodge, Iowa.....	North Dakota, Minnesota, Iowa, western Illinois.
Eighty-ninth.....	Funston, Kans.....	Kansas, Missouri, South Dakota, Nebraska.
Ninetieth.....	Travis, Tex.....	Texas, Oklahoma.
Ninety-first.....	Lewis, Wash.....	Alaska, Washington, Oregon, California, Idaho, Nebraska, Montana, Wyoming, Utah.
Ninety-second.....	Funston, Kans.....	Colored, various States.
Ninety-third.....	Stuart, Va.....	Do.

In all there were 41 American divisions in France beside some units of other divisions before the signing of the armistice, 7 Regular Army divisions, 17 National Guard divisions, and 17 National Army divisions, and there were in training in the United States 13 Regular Army divisions and 4 National Army divisions.

On the 7th day of August, 1918, General Order No. 73, War Department, was issued in effect creating the Army of the United States. The relatively small contingents both of men and officers who belonged to the Regular Army and National Guard, strictly and so-called, at the time of this order had been submerged in the vast levies brought into the service through the selective-service law. Recruits and replacements had infiltrated every organization with drafted men, and the necessities of the service requiring the transfer of officers had quite obliterated the distinctions existing at the beginning of the mobilization between Regular Army officers, National Guard officers, and emergency officers. In providing for the rapid training of so great a force, it was necessary wherever possible to detach officers from organizations and reassign them to new groups, and very often to take both officers and men from traditional arms for assignment and

service with organizations created for the development and use of the novel appliances introduced in this war and requiring specially selected and trained men for their use. As a consequence, when the armistice was signed we had but one Army—a few thousand men serving in it were still serving under enlistment contracts in the Regular Army entered into before April, 1917, but that number was insignificant as compared even with the authorized peace-time strength of the Regular Army. The vast majority of the force was under a duration of the war obligation of service, and legislation required the discharge of all such men within four months after the formal promulgation of the establishment of peace.

It was apparent, therefore, that demobilization would leave a mere handful of men in the Regular Army. The draft into the Federal service of the National Guard has operated to terminate the obligations of the National Guard under their State contracts of enlistment. Its demobilization, therefore, would leave the States without any National Guard, except to the extent that fresh organizations had been formed during the war. In some States an attempt had been made to organize a force to replace that drafted into the Federal service. In most of the States, however, a temporary force known as the Home Guard had been created. Its purpose was obviously temporary, and it dissolved rapidly. It was not designed to secure Federal recognition, or to constitute a permanent military force, nor was it at any time large enough adequately to perform the duty ordinarily resting upon the National Guard. For this reason, an emergency force had been authorized to be created under the Militia Bureau of the War Department known as the United States Guards into which men were received who for physical or other reasons were not eligible to overseas service, but were able to do the work of plant protection and the maintenance of public order in the United States should emergencies arise requiring the use of military forces for such purposes. The United States Guards and the National Army were, of course, held only under emergency obligations. Demobilization, therefore, meant the practical annihilation of all organized military forces in the United States, and if it could have been instantly effected upon the day of the armistice by the discharge of all officers and men in the Military Establishment under duration of the war obligations it would have left in the Army, or in any organized military force, the surviving officers of the Regular Army, 10,619; about 112,000 enlisted men, largely in certain Cavalry organizations in the Southern Department; and the recently organized National Guard of some of the States as yet by no means adequately trained and equipped. It was, therefore, clearly necessary to develop a project which would preserve an adequate military force, and at the same time not delay demobilization and return to their homes of the men brought into the

service of the Government for the emergency and now properly impatient to be permitted to resume their civilian occupations.

With this purpose in view the Congress was asked to authorize the reopening of enlistments in the Regular Army as authorized by the national-defense act of 1916, and authority was given to receive such enlistments either for one or three year periods. At the time this authority was given a substantial force was still in Europe and the Siberian Expeditionary Force, of course, contained a very large number of men under duration of the war obligations. The War Department, therefore, held out as an inducement enlistment in one or the other fields of these operations. The responses were gratifyingly large as is shown by the following table which gives the enlistments, in the two classes as to duration of service, from the reopening of enlistments to the 1st of November, 1919:

Enlistments since Feb. 28, 1919, showing 1 and 3 year periods.

Week end.	1 year.	3 years.	Total.	Week end.	1 year.	3 years.	Total.
To Apr. 5.....	3,566	2,803	6,369	Aug. 2.....	2,837	1,777	4,614
Apr. 12.....	1,740	2,714	4,454	Aug. 9.....	2,391	1,517	3,908
Apr. 19.....	2,817	3,025	5,842	Aug. 16.....	2,488	1,890	4,378
Apr. 26.....	2,345	2,785	5,130	Aug. 23.....	1,636	1,361	2,997
May 3.....	1,803	3,124	4,927	Aug. 30.....	1,748	1,282	3,030
May 10.....	2,170	3,467	5,637	Sept. 6.....	1,809	1,050	2,859
May 17.....	1,856	3,008	4,864	Sept. 13.....	2,122	1,367	3,489
May 24.....	1,574	2,741	4,315	Sept. 20.....	1,621	1,113	2,734
May 31.....	2,212	2,937	5,149	Sept. 27.....	2,292	1,135	3,427
June 7.....	2,957	2,488	5,445	Oct. 4.....	1,469	885	2,354
June 14.....	2,587	2,154	4,741	Oct. 11.....	1,827	903	2,730
June 21.....	2,894	2,346	5,240	Oct. 18.....	2,067	1,283	3,350
June 28.....	3,935	2,649	6,584	Oct. 25.....	1,674	1,901	3,575
July 5.....	2,793	2,024	4,817	Nov. 1.....	1,681	1,596	3,277
July 12.....	4,483	2,465	6,948				
July 19.....	3,512	1,964	5,476				
July 26.....	2,657	1,743	4,400				
				Total.....	73,563	63,497	137,060

The experience of this war plainly shows the necessity for a fundamental reorganization of the Army and of the War Department itself. The most striking departures from traditional warfare developed since 1914, are: First, the immense size of modern armies which entail more complicated systems of supply, and require a broader basis of industrial support at home as well as the application of all the most modern implements of transportation both for the mobility of the army itself, and for its maintenance in the field.

Second. The tendency of armed conflict to become a war of positions rather than a war of movement. Heretofore improvements in the art of war have been a sequence of modifications of the means of offense and defense. An offensive weapon is developed by one side which is more accurate or more effective than those in use by the adversary and the immediate response has been the development of a defense in answer to the new attack, the enemy at the same time appealing to the ingenuity of its inventors to produce in time a better weapon of attack than that used against him. But we seem now to

have come to a place where, by the introduction of high explosives and long-range weapons of great precision, the question of defense becomes one of elaborate engineering, and an army must have a system of protective and defensive works which render it almost immobile. One of the immediate results of this development is the vast increase in the proportion of the artillery arm in modern armies—an increase which is further emphasized by the use of curtain fire and barrage as an accompaniment of infantry conflicts.

Third. The introduction of new arms of such highly specialized scientific or mechanical character as to require special training in their use. The most notable of these implements are the airplane, the tank and noxious gases. No one of these implements implies quite so complete a detached use as was formerly true of Cavalry and Artillery. The airplane, for instance, is used for reconnaissance and bombing in the the camps and munition dumps of the enemy, and in remote places back of the enemy's lines with a view to destroying accumulated reserve supplies. The solo-fighting airplane is the guardian of its slower consort engaged in reconnaissance or bombing operations. It is also the attacking force against reconnaissance or bombing operations by the enemy. But the air forces do not operate independently. They must be intimately associated with the troops on the ground, seeking information which will be useful in directing artillery fire and infantry advances, and actually protecting troops on the ground from raking machine-gun fire by low-flying enemy aircraft. Long distance bombing excursions into the interior of enemy country undoubtedly have a depressing effect upon the morale of the enemy, but this more or less independent operation is the less important use of aircraft in war, and, if warfare is to have any humane restraints, will be in the future less resorted to, primarily aimed at accumulations of munitions and supplies. Bombs dropped on an inland city from which the civil inhabitants have not been removed means danger indiscriminately to women, children, and other non-combatants, while at the same time it causes widespread destruction of property without direct military object.

The tank, as yet only at the beginning of its development, is a land battleship, moving in cooperation with infantry advances, breaking down wire entanglements and other obstacles, and attacking, in relative security, positions from which machine-gun fire is holding up the infantry advance. Its operations are plainly a part of the general land movement, but it is a vast and intricate machine, requiring mechanical knowledge and skill far greater than there is time to give to troops not specially devoted to its use.

Chemical agencies in warfare present a variety of problems, and have already raised sharp conflicts of view as to limitations upon their use, if not, indeed, upon the propriety of their being used at all.

Whether or not their offensive use ought to be initiated by a country depends upon a variety of considerations which I need not here discuss, but in any case a modern army must be able to meet offensive chemical warfare with the most scientific protective devices, and must make such studies and give such training as will prevent an enemy from succeeding by mere ruthlessness.

The prewar organization of the American Army was departmental. The department commander had under his command the troops scattered in small units here and there within the geographical limits of his department. There was no opportunity for maneuvers on a large scale; little opportunity for the joint training of troops of the several arms, and, of course, no practical experience in the staff work necessary for the management of great bodies of men. The first step, therefore, in any policy which aims to produce an effective army must be to create a tactical organization in place of the old departmental and geographical distribution. The ideal may be stated as follows:

We should have such an Army in times of peace as will embrace all the arms and all the functions necessary in time of war, and of such size as will permit all arms to be so adequately represented that their peace-time training will produce, first, a body of officers able to administer and command an army in the field, and, second, a body of trained soldiers—each arm of which will be thoroughly trained in its own function and will know what it is to expect in action from the other arms and what, in turn, it must do in order that the other arms may function freely and fully in their fields. In other words, it must be a complete unit army, so that when the emergency comes its increase in size will be by a process of multiplication of existing organizations and functions, and not by the introduction of new organizations and new functions with which new experience has to be had in training or in maneuvers.

The opportunity for such a reorganization of the Army is at the present time most favorable. Great training camps were needed during the war; they were selected in convenient locations, and equipped with buildings adequate to accommodate full divisions with all the necessary adjuncts of corps, army, and supply troops. The expenditures made by the Government in these camps were such that the land value is a relatively small part of the investment, and sound business considerations direct the acquisition of the land merely as a means of salvaging in part the investment already made. When acquired, however, the land, improved by permanent roads, drainage and sewer systems, water supply, electric-light service, and other utilities, will constitute ideal quarters for troops in training. They have their barrack buildings, hospitals, storage facilities, theaters, halls, and offices of administration all provided. They are equipped with ranges for small-arms instruction, and, in some

instances the sites are sufficiently removed from populated sections of the country and sufficiently large to permit practice with divisional artillery. Moreover, the Army now has a body of officers actually trained in battle in the management of these large tactical units, and such a reorganization of the Army as herein described will serve to keep alive and hand on the traditions and knowledge thus gained.

As a result of a prolonged study of the entire situation, the Chief of Staff, with my approval, prepared a bill for the consideration of the two Houses of the Congress. Its purpose was twofold; first, to make permanent the reorganization of the War Department found necessary during the war, and, second, to provide such a Regular Army as would respond to the ideal above set forth.

With regard to the first of these objects, it is to be observed that the bill strengthens the General Staff in its control of the entire Military Establishment. Under the system of War Department administration existing prior to the establishment of the General Staff, the supply bureaus had a large degree of independence. Appropriations were made by the Congress to be expended by the chiefs of the bureaus, subject, of course, to the control of the Secretary of War, and upon estimates provided by him, but without any such current coordination as was necessary effectively to make them smoothly working parts of a great centralized organization. There was duplication of functions, conflict of jurisdiction, and a natural competition among the bureaus, each zealously seeking to preserve the importance of its own function. The history and weakness of this system has been so fully and powerfully stated by Secretary Root that it needs no restatement here. The remedy suggested by him, and adopted by the Congress, was the creation of a General Staff, and the donation to the Chief of Staff of certain functions of control and coordination which greatly improved the situation. But the General Staff found itself under two embarrassments; in the first place, the high degree of centralization which an effective General Staff employs inspired many Members of Congress with the fear that it would grow to be a tyrannical and arbitrary power. The public press of the country was constantly referring to the great German military machine, and to the fact that the great general staff in the German Empire had practically seized the reins of government and was bending the civil, social, and religious life of the German people into conformity to its will. This menacing picture of the transformation of the industrious and romantic people of Germany into a pliant, subservient tool of the military power, had in the background all the time the Imperial General Staff, so that the very name came to be hated and feared by those who saw what such a centralized military autocracy was doing to the soul of a great people. As a consequence, Congress acted with distrust toward the

General Staff which it had itself created, limiting its numbers and circumscribing its functions from time to time.

The second difficulty arose from the inertia and traditions of the bureaus themselves. The chiefs of the bureaus were retained with a fixed tenure of office; in some cases appointment as chief of a bureau was limited to the commissioned personnel of the particular corps—an appropriate enough limitation in highly technical corps like the Engineer and Medical Corps, but inappropriate in the general supply bureaus and particularly inappropriate after the substitution of the detail system in the supply bureaus for the permanent commissioned personnel originally obtaining. The bureaus were headed by aggressive specialists. Each felt that the responsibility for the success of his bureau depended upon him, and resented anything diminishing his authority or narrowing his functions.

As a consequence, the old controversies between the staff and the line of the Army, while modified, were not abated by the General Staff law, and the bureaus yielded reluctantly to coordinations. In part this attitude was due to mere tradition, but in part it was based upon the fear that loss of independence and prestige would increase the difficulty of securing desirable personnel in the bureaus. In times of peace these embarrassments were not serious, but with the advent of the war the whole condition changed. The ordinary markets and manufacturing facilities of the country no longer supplied an easy and abundant field of choice. It became apparent at once that the demands of each of the supply bureaus were so great that they became competitors for a supply insufficient to meet all their needs, competitors with the civilian population and competitors with the allied purchasing agencies which were attempting to supply their own armies and civil populations.

This condition followed inevitably from the size of the purchases necessary to be made for the Army, and the highly special and uniform character of the articles used by it. The Army comprised about one twenty-fifth of the entire population of the country, and it might be assumed that after being taken into the Army they would require and consume about one twenty-fifth of the ordinary articles of food and clothing normally used in the United States, so that the problem would be merely to divert, through Army channels, the same amounts of food and clothing as these men would have used in their homes if they had remained there. The facts, however, are very different. The Army purchased in 1918 far more woolen socks and stockings than the country normally produces in an entire year for the whole civil population. In blankets the Army purchases were more than twice the normal gross production. In part-leather gloves they were three times as great. The purchases of wool for Army use were far greater than the normal annual consumption of

the entire Nation. In many other items, like motor trucks, the Army purchases did not equal the aggregate annual output of the country, but because of the specialized and uniform types required by the Army, diversions of facilities were made necessary, which further complicated the industrial situation.

With commendable foresight the chiefs of the bureaus reached out for supplies of raw materials, with the result that practically the entire available supply of certain items needed by all was under the control of a single bureau. It was obviously necessary to control this situation to eliminate competition and to allocate the available supplies from day to day to the most urgent need. As a result, under the direction of the President, under the Overman law, centralized buying was established as to all articles used by more than one bureau and a system established which worked in harmony with the War Industries Board, pooling the needs of the Army with other needs which had to be supplied by the resources of the country. The system so established and perfected by growth and change should be retained, not merely because of the economies it produces, but because we ought never again to face the necessity of abandoning a system adequate only for the small operations of a peace-time establishment, and creating anew an organization adapted to the emergencies of war after the crisis has arisen.

Those who criticize the organization of the War Department as it now is do so primarily on the ground that it subjects supply bureaus to General Staff control; that is to say, that it places the purchase of commodities under the general supervision of soldiers rather than of business men, and that as the officers of the Army are chosen for an entirely different set of aptitudes and talents and are trained in occupations widely separated from commerce and industry, their control is not businesslike and not based upon a knowledge of business. That there is some truth in this may, of course, be admitted, and yet General Staff control does not mean the exclusion of business experts, but it does mean the subordination of the business specialists to a proper place in a general program. Moreover, the only complete answer to the criticism would be a total separation of the supply bureaus from the Military Establishment. This we had substantially under the old bureau system which produced a long and trying history of disagreement between the producer and the user; differences of judgment between the bureau chief, who was a business man, and the soldiers in the field who had to use the articles supplied.

The Military Establishment of the United States in times of peace is not large enough to engage the talents of highly trained and successful business men to operate its supply departments. No wide range of business talent is necessary. The articles to be purchased are standardized and uniform, and from year to year mere

duplication in purchases, with slight modifications, is all that is necessary.

On the whole it would seem that the retention of the system established during the war cut down numerically to the peace-time needs of the Army would be the wisest course. We would then have an organization built upon correct lines, adapted to function in an emergency, and when war came it would be necessary only to enlarge the organization, bringing in business men and experts in large numbers from civil life to carry on the greatly increased services of supply.

The second object of the bill was to authorize an Army which could be effectively trained and multiplied in a crisis. In round numbers the recommendation was for 500,000 men. As compared with the prewar Army this number seems large, but it must be remembered that several new arms have been shown to be necessary in an army. The Air Service, the Transportation Corps, the Motor Transport Corps, and the Tank Corps are all new organizations to be provided with both officers and enlisted personnel. In addition, the size of a division and of the subordinate units has been increased, with corresponding increases made necessary in the auxiliary services. The organization suggested was practically one field army divided into corps and divisions.

The recommendation was not based upon an attempt to forecast any particular state of international relations, or to provide for the assumption of international duties requiring the use abroad of American troops. It did, however, recognize the fact that the National Guard of the country has for the most part disappeared and that it would be some time before it can be effectively reconstituted. It took into account also the possibility of some system of universal service based upon the training of young men in association with Regular Army officers, and, of course, requiring trained officers and noncommissioned officers in larger numbers than the strength of the Regular Army, without that, would justify.

This recommendation has been suggested to indicate a disinclination on the part of the War Department toward the prospect of international disarmament, but the suggestion is without real basis. The professional soldiers of the United States love their profession; they think of it as a high and dignified calling, and one which it is honorable to pursue so long as the arbitrament of war remains as a means of international adjustment. Those who know the spirit of the American Army will not ascribe to it any provocative temper. There is glory left in the career and the sacrifice of the soldier, but the mild and spectacular contests of an earlier age have become a stern and cruel business in this age of industry and ingenuity, and while there is cheerful willingness to encounter the privations and make the

sacrifices which war demands, the men of the American Army are abreast with enlightened men everywhere in the hope that more humane and rational processes of adjustment will supersede the waste and loss of armed conflict. They are, however, of the belief that so long as it is necessary for us to maintain an Army at all we are not justified in having an inefficient Army, and their recommendations are to be viewed not as separating them in spirit from their peace-loving fellow countrymen, but as setting them apart as men who, by reason of their experience, are qualified to speak upon the provision which should be made for the common good and the common protection should the test of war become unavoidable.

After all there are two important considerations to be remembered in this matter; first, we Americans have a traditional belief that large standing armies are a menace to free institutions. That such armies were at one time a menace is clear; though the argument is much overstrained which makes a menace of an army of citizens drawn for a brief period from the common life of the country, because in former times an army of professional soldiers monopolizing military knowledge, and constituting a superior caste under the patronage and control of a despot, was such a menace. It is difficult to believe that an army could be formed of Americans, educated in our common schools, raised in the free and democratic atmosphere of our institutions, conscious of the blessings which liberty and political equality have brought to us as a nation, and which would still be hostile to those institutions and liberties. The World War has shown quite clearly that armies reflect the spirit of the people from whom they come rather than create a spirit of their own, so that the size of the army is not so important from the point of view now under consideration as the kind of an army.

The other point to be remembered is the cost. European nations have groaned under the burden which the maintenance of their great armaments has imposed. It is economically inadmissible to consider fastening upon the people of this country a great body of idle and unproductive men withdrawn from industry and trained merely to be held in readiness, at great annual outlay, against the emergency of war. Indeed, it is greatly to be doubted whether men could be found to enlist in such an Army. The aspirations of American youths draw them into occupations which promise training for higher usefulness, and mere military training has no market. There are, in fact, just three ways in which men can be gotten into an army: (1) By compulsion, (2) by money inducement, and (3) by making an enlistment in the Army an educational opportunity.

The country has accepted the principle of the selective-service law as the fair and democratic mode of assigning men to military service

in war, but compulsory service in time of peace the country has not accepted, and its application would be a poor substitute for the volunteer principle properly applied.

The second of the possible plans of raising an army, namely, by a money inducement, calls upon the Government to enter into competition with industry, and imposes an impossible financial burden. It brings the volunteer in upon a lower basis than compulsion, as there is no idea of national service, and none of personal development or advantage beyond the mere pay received.

The third of these plans, however, is in harmony with the genius of our institutions. It contemplates the establishment of a system of training divided into two parts, the first military and the other educational and social. The second part of the plan looks to the establishment of systems of schools adapted to the needs and aptitudes of the men, teaching the formal branches of education and adding to them the skilled trades, so that at the end of a term of enlistment, the young man entering in his nineteenth year will go back to civil life with the physical set-up which the open, athletic life of the Army gives, and with the education and training which will make him more valuable in civil pursuits than he could otherwise have been. And this system of training and education must be complete and carried out not half-heartedly, but whole-heartedly and surrounded by social and recreational opportunities supplied by the Government and administered by wise and sympathetic men, so that the graduate from the Army will have been to school and will bring back with him the social virtues which result from education of mind and hand acquired in an environment made stimulating by the presence of a high purpose and sense of service, and generous association with his fellows. An army trained in such a spirit would be an effective weapon for the protection of the national interest; it would not be an idle and unproductive body, but would be an invaluable addition to the educational facilities of the country, and incidentally it would repeat year after year the great fusing operations which we saw in the war, whereby men of all tongues and races, and from all the widely scattered parts of our own great country, were brought together in intimate association and taught to interpret and appreciate alike the solid foundations upon which liberty and progress rest in a democracy.

The military policy recommended by the War Department, therefore, involves a new Army created with a new spirit, having wide civic usefulness, and of such size and organization as to be an adequate reliance in case of need.

At another place in this report will be found some comment upon the educational activities of the Army created for this war, both before and after the armistice, and some description of the plans already

matured for continuing the spirit they have developed. Those comments are to be considered in connection with what is here written on the general subject of a permanent military policy, as the whole of the plan as conceived is based upon and justified by the educational value of service to the men. It is not my purpose and it would not be just to criticize the Army of the United States prior to 1917. It was frankly built upon an entirely different theory; but when it came to the test of war it proved its loyalty and its efficiency by its success—a success not alone in winning an ultimate military victory, but a success in expanding its own organization and spreading its knowledge over vast numbers of men, so that it may be fairly said that our Army grew in efficiency as rapidly as it grew in numbers, a thing which would not have been possible had the officers of the Regular Army not been themselves eager to learn and teach, hospitable to new ideas, and generous in the recognition of the ability of others to serve.

There were, however, officers in the Regular Army and others from civil life, who did not understand the psychology of the citizen recruit, and who misconceived the basis of discipline among men drawn to the ranks by an exalted sense of national duty. They continued to regard the "enlisted man" as a soldier who had volunteered into an occupation. This resulted sometimes in resentment and often in the feeling that there was a lack of sympathy and understanding on the part of officers. Incidents of this kind were not perhaps very frequent, but they were frequent enough to show that in the new army such possibilities must be excluded. In order to exclude them, the soldier in times of peace must be worthily engaged, occupied with self-improvement, filled with aspirations for success in civil life and, having an active part in military service, feel that it is to him a combination of an opportunity to serve his country and an opportunity to equip himself for higher things when his enlistment is over. Officers will inevitably see that discipline of such men does not rest upon mere compulsion, but requires leadership and democratic recognitions, and the men will see that their officers are not a caste or a class but are, in a happy sense, their leaders.

The permanent military policy here suggested then embraces, first, such reorganization of the War Department as will preserve the efficient instrumentalities which have been developed during the war; second, an army which will be adequate in size to be the nucleus of any great military mobilization the country may be called upon to make; and third, an army of officers and men to whom the whole experience of military service will be an opportunity for self-development and education, the officers becoming a permanent corps of experts and the men a body temporarily devoting a portion of their time to military training in order that they may enter civil life with

a sense of national service and with superior equipment for success. The accent is not upon the soldier, but upon the citizen, in such a policy.

AN INDEPENDENT AIR SERVICE.

The airplane was developed during this war from small beginnings into an instrument of the highest importance. When the war broke out, only a few years had intervened from the first successful attempts to fly heavier-than-air machines. The European belligerents immediately devoted their best talents to the development and production of aircraft, and throughout the war the progress was rapid and continuous, so that each year the best machines of the previous year were out-built, and extraordinary progress was made in speed, certainty of action, stability, and carrying power. This carried the war into the third dimension and raised new questions as to the relation of aircraft to the prewar military and naval establishments. Air raids upon great unfortified cities like London and Paris brought into the war a new element and constituted an abandonment of the time-honored practice among civilized peoples of restricting bombardment to fortified places or to places from which the civil population had an opportunity to be removed. The practice was a part of the ruthlessness with which the Central Empires sought to terrify England and France into submission.

The actual loss of life caused by these bombardments was relatively small and the destruction of property, while large, had no appreciable effect upon the war-making power of either nation. Indeed, it may rather be said that the willingness of the enemy casually to slaughter women and children, and to destroy property of no military value or use, demonstrated to England and France the necessity of beating so brutal a foe, and it is most likely that history will record these manifestations of inhumanity as the most powerful aids to recruitment in the nations against which they were made.

There naturally grew up a system of antiaircraft defense, consisting of specially devised and adapted guns strategically posted on land, observation stations and systems for transmitting the alarm at the approach of hostile aircraft, and specially devised fighting airplanes for attack, to either drive off or destroy bomb-carrying enemy planes. They led also to a determination to retaliate by similar raids back of the enemy lines. Upon the wisdom of this course there was much discussion, the more humane elements of opinion resisted being drawn into such a course, while an angered section of public opinion felt that the enemy was one having no philosophy but success, and no restraint of fear of the consequences. The geographical situation of England made it peculiarly subject to attacks of this sort, and there, therefore, grew up in England a sentiment in favor of an independent force which, disassociated from the other military operations of the

Allies, could carry out independent bombing operations on such a scale as should be necessary to protect English women and children by making the Germans fear to continue a mode of warfare which no humane instincts seemed able to restrain. For a variety of reasons into which it is not here important to go, but which have in part to do with the heavy tasks already laid upon the traditional military establishments and in part with the novel and rapid development of aircraft, the Air Service was given an independent status, although, of course, such Air Service as was necessary to act in immediate cooperation with either military or naval forces was placed under the respective command of the Army and the Navy.

When the armistice came, all the nations which had been engaged in the war faced a reorganization of offensive and defensive military agencies, and the question at once arose as to how far air fighting and the production and development of airplanes constituted so separate a problem as to justify separation from the Army and Navy, both in peace time and in war. This discussion has gone on in our own country, and bills have been introduced in Congress which aim to create an independent Air Service, some of them going so far as to create a new department of the Government, with a member of the Cabinet as its head. Proposals on this subject have ranged the whole way from complete separation and independence to the separation only of the technical work of design and production, and apparently much of the difference of opinion on the subject is due to the varying optimism and enthusiasm as to the possibility of future development of the airplane with which the subject is approached.

In its very nature, the navigation of the air is a subject to fascinate the imagination. We are all becoming accustomed to these great mechanical eagles outflying the birds, vaulting through space and performing dazzling and terrifying aeronautical feats in defiance of all the limitations upon human movement to which we have been used; but each day seems to bring forth from the imagination of those who are making these contributions to our knowledge promises of even greater exploits. Sober men now speak of devices which will enable heavier-than-air machines to be sent 50,000 feet above the surface of the earth and there attain speeds which destroy the old relations of distance. The art itself is so new and so fascinating, and the men in it have so taken on the character of supermen, that it is difficult to reason coldly, and perhaps dangerous to attempt any limitation upon the future based even upon the most favorable view of present attainments. Nevertheless, there are some considerations which, when stated, enable us at least to see clearly the present problem.

In this war the airplane was primarily valuable for observation purposes. The old war of movement gave place to a war of positions

by reason of the vast forces engaged and concentrated upon a relatively short frontier. The cavalry arm had little opportunity to perform the function usually allotted to it; knowledge of enemy movement of troops for the purpose of massing and supplying them at concentration points for attack was therefore largely secured through aerial observation from balloons and airplanes. Photographing the enemy lines and territory back of them was also an important source of information. Each side sought to gain as much information in this manner as possible, and to prevent enemy observation by anti-aircraft gunfire and by fighting airplanes armed with incendiary ammunition which burned up the gas bags of balloons or by gunfire drove off or destroyed enemy airplanes. In addition to this, airplanes undertook extensive bombing operations for the purpose of destroying railroad centers, ammunition dumps, and factories, and dispersing massed troops back of the enemy's lines. Their effectiveness in these operations was, of course, diminished as they were forced to operate at higher and higher altitudes by the development of antiaircraft artillery, and increased from time to time as scientific instruments lent greater precision to bomb dropping. In addition to these operations, airplanes were indispensable in the control of artillery fire and were frequently used to harass and delay marching infantry columns by low altitude flying and machine gun fire.

How far the airplane by being armored to resist shrapnel, or by the perfection of its scientific instruments can be developed so that its bombing operations will obtain more serviceable certainty, can not be foretold; but it is interesting to note that although the Germans developed the bomb-dropping machine and used it extensively, the direct damage inflicted was relatively small. In the American Army, out of 222,252 casualties admitted to hospital as a result of battle injuries, only 141 were occasioned by airplane bombs. These figures must not be taken to indicate that air bombing is not an important military operation, although they do seem to show that if the aerial bombardment of back areas and inland cities be excluded, as it should plainly be excluded upon the most elemental ethical and humanitarian grounds, then the usefulness of airplanes for observation purposes and for fire control in the present state of development of aeronautics far outweighs their effectiveness as implements of direct attack upon enemy forces. In such matters, however, it must never be forgotten that we are at the very beginning of possible developments; indeed, the air armament actually used in the war is now practically obsolete, and machines were in the process of perfection when the armistice came, and undoubtedly others will be rapidly devised, which will necessitate even more radical modification of military practice than those already in use. The aerial bomb, either controlled by wireless from a mothering

consort, or under gyroscopic control from the point of release, is already a practical implement. Such bombs, carrying very large quantities of high explosives and having no pilot whose safety is involved, could even now be launched, travel with remarkable accuracy a predetermined route and, by wing collapse at a predetermined distance, effect wide destruction. It is at least a possibility upon which serious men are thinking, that such bombs may some day replace heavy guns and make obsolete the whole practice of building long-range artillery which must either be fired from fixed emplacements or is at best moved with slowness and difficulty from place to place.

The uses and possibilities above described are, however, all essentially military and, so far as land operations are concerned, are merely an extension into the air of the modes of attack, counter-attack, and defense land armies are accustomed to use. In their nature, they depend upon land forces for their preparation and control, and in some part upon the land forces for defense even against enemy air attack. Moreover, the particular services rendered by aircraft so far are to lend knowledge to the operation of land forces with which they are in cooperation, and those who realize the extent to which victory in warfare depends upon concentration of the control of combined operations will perceive the seriousness with which any proposal must be viewed which undertakes to separate services which must be so instantly knit together when the time for action arrives. Nobody would think of suggesting that artillery should be a separate service, or cavalry, in any other sense than that they should have their experts giving special attention to their development, but all the time in immediate cooperation with the other services and under the control of a single command. Nor would temporary control, asserted merely for the purpose of combined operations, be enough. The whole purpose of military training and discipline is to inculcate a series of habits of cooperation and obedience which will leave as little as possible to be learned when the hour of trial comes. The uniform, the spirit of membership in the Army, the fellowship of constant association, the experience of constant cooperation, the knowledge which each arm of the service has of the functions of the other arms of the service, the ways they fit into, supplement, and support one another, the extent to which they can be relied upon, all form parts of the material of success, and that commander has the best army whose men from top to bottom realize the extent to which the performance of duty by each is the predicate upon which the successful performance of others depends.

For these reasons, it would seem unfortunate to have an independent military air service, to be brought into cooperation with a land army either for particular or general operations, and the analogy

of joint land and water operations against seacoast emplacements is not helpful, as there can be no such intimacy or correlation between the land and the seas as there is between the air and the land. It is plainly better for the military air service to be military, to have its soldiers and its officers trained in the same school of discipline and trained together as often as possible with the men of the land army, and to have, wherever possible, interchange between the two so that each will feel in the most intimate possible manner its relation to the other. To separate them makes them rival services with the whole train of evils which such rivalry creates, evils which in peace time mean contention before Congress for unbalanced appropriations, grievances and fretfulness about relative rank and rapidity of promotion, and in time of war the substitution of combined service prides for a single emotion of pride in one service.

These very obvious considerations, however, by no means exhaust the subject, for the airplane presents not only the possibility of military usefulness, but the prospect of civilian usefulness to which at present we have not the means of setting any limit; and there are some primary facts about the production of airplanes which enter into this problem with commanding force. In the first place, airplanes are very expensive. Their initial cost is high and apparently always will be; because of the peril involved to those who operate them they must be constructed of the best and most carefully inspected and selected materials, and by the most highly skilled, and therefore highly paid, mechanics. They are frail, easily injured, costly to repair, and rapidly worn out, and these qualities seem more or less permanent; so that even if relatively stabilized types were devised and the maximum economies of quantity production obtained, they would still be extremely costly as compared with other means of transportation and other military equipment.

In the second place, the art is new. Its development requires concentration of inventive genius and stimulus to invention. The cost of experimentation on a proper scale is beyond the reach of private means. A really progressive airplane industry in the present state of the art can not be maintained except with the Government as a prospective purchaser, and if the sole purpose for which the Government makes appropriations is the development of war machines, the commercial possibilities of aircraft will be neglected, which would be a detriment both to the general industrial progress of the country and to the Army itself, since the Army has an interest very real, if more remote than its immediate military interest, in having available for its use the most highly developed agencies of transportation to be used as a supplement when unusual speed is required or difficulties otherwise insuperable are to be overcome.

Third, if military aviation is to attain its maximum development, it should be as a specialized branch of a general practice; that is to say, ideally considered, flying should become a very common thing, with large numbers of men trained in the elements of the art and in its daily practice, with landing fields conveniently placed about the country and mechanics and facilities for repair accessible practically everywhere. In this situation, an emergency would find the country able rapidly to recruit its air forces by taking into the military service those who in the practice of the art generally had shown special aptitude and fitness, and it would be necessary to add only the military training and special knowledge of military aeronautics. For obvious reasons, no country can train and maintain in time of peace such a number of aviators as it would need immediately upon the outbreak of hostilities, and it would greatly expedite the increase of the air force if the Army could find, ready to its hand, a great number of partially trained men.

It seems to me clear, therefore, that the development of aeronautics must depend upon national patronage and support; that if we are to have an industry ready to produce military airplanes in large numbers rapidly in the event of need, such an industry will have to be built up in time of peace and maintained at least to the point from which rapid expansion is possible without the delays necessarily incident to the inauguration of new industrial enterprises and the training of entirely new organizations for production. It seems clear, too, that the industry must to a certain extent be under national control, as must flying itself be under national regulations. Even if it were profitable, private enterprise could not be given a free hand to develop and manufacture airplanes to sell them freely as articles of commerce, imposing upon the purchaser the whole responsibility for the use he makes of his purchase. There must be regulations which will require training before men can be permitted to navigate the air and expose to peril both themselves and the lives and property of others over whom they may fly. Laws of the air, like laws of the road, must be made and enforced. All of these look to Federal regulation and control.

The answers, therefore, to the questions involved in the future of the air service are not simple, and dogmatism is out of place. Just how far the national interest will justify Congress in making appropriations for experimentation and for the maintenance of the airplane industry, how concentrated in time these appropriations should be made, what agencies of development and control should be organized, the extent to which centralization would be helpful, are all questions to which the answers of enthusiasm and of doubt are alike open to objection. A sound national policy, however, would seem to involve a generous attitude on the part of the Congress in the

matter of appropriations, recognizing the commercial possibilities of the airplane by encouraging its use in the Postal Service, and of course recognizing its tremendous importance both to the Army and the Navy. Having determined how far these various possibilities justify support, an aggregate appropriation might be made to be expended under the direction of the President upon the advice of a board of which the Secretary of War, the Secretary of the Navy, the Postmaster General, and the Secretary of Commerce would be members. Such a board would inevitably consider the special needs of the military and commercial interests and would watch from day to day the developments of the art as it promised greater usefulness in one or the other direction.

By such cooperation of the special services, an interchange, if not a direct pooling, of engineering could be effected, and ultimately training could be arranged to be given to civilian aviators in the same schools and with the same facilities as are used in the early stages of the training of military and naval aviators. Such a board could appropriately advise the President upon the matter of flying regulations, and the President could in turn bring legislation to the attention of Congress.

By the use of the aggregate fund thus placed under the President's general direction, encouragement to the extent of the funds available could be given to the industry, and the orders for Government account so placed as to maintain as extensive facilities as possible for the rapid production of specialized types of aircraft in the event of emergency. Such a board could also bring into the field of its general study and operation the manufacture and use of lighter-than-air craft, and it may be worth while here to observe that with the quantity production of noninflammable gas the possibilities of the rigid and dirigible balloon are in many ways as promising as those of the airplane. As the Chief Executive, having under his constant care the commercial and industrial development of the country as well as the national defense, the President would undoubtedly cause himself to be advised from time to time as to the best distribution of jurisdiction in this field, and by assigning to the Army and Navy the functions which can best be performed by them, respectively, and by bringing to a common view the needs of the military establishments and of commerce, the best results could be obtained.

On the whole case, it seems quite clear that the time has not come to set up an independent department of the air, there being as yet no commercial use nor likelihood of the commercial use of the airplane which will prove profitable enough to maintain the industry, and certainly no such prospect of independent effectiveness of aircraft as an agency of war to justify reliance upon it to the detriment of the traditional military arms. As a matter of fact, in war, as yet, the

infantry is the backbone of military effort, and all other arms on land, on the sea, and in the air, are mere aids to its advance and protections to it while it is performing its functions of advance and occupation.

THE ADJUTANT GENERAL'S DEPARTMENT.

The volume of work in this office increased to vast proportions during the fiscal year 1919 and was in direct ratio to the steady and enormous increase in the strength of the Army itself. This did not decrease, however, but rather increased, with the process of demobilization. Some idea of the increase of work may be gathered from the following statistics:

In 1916 the average number of pieces of mail received and handled daily was 3,026.

In 1918 this had jumped to 75,286.

In 1919 a further increase brought the figures to 287,266.

During the fiscal year 1919 this office in addition distributed 161,316,724 documents of varying nature.

These figures do not include returns, rosters, enlistment papers, service records, identification records, duplicate allotment forms, periodical reports, and numerous other records, these having been received in such vast quantities that it was out of the question to keep account of their number.

RECORDS OF THE SELECTIVE SERVICE RECORD DIVISION.

I. RECORDS.

These consist of all records pertaining to the draft for the World War. They were withdrawn from the custody of the Provost Marshal General, State headquarters, district and local boards, and placed in the custody of The Adjutant General under instructions of the Secretary of War of November 27, 1918.

They comprise the records of:

The Provost Marshal General's office.

51 State and territorial headquarters.

155 district boards.

4,648 local boards.

1,319 medical advisory boards.

3,646 legal advisory boards.

They contain the records of 23,908,576 registrants and many miscellaneous papers; their gross volume was 400,000 cubic feet, and their net volume (after unpacking) about 300,000 cubic feet; they will fill 14 buildings, and, with file cases stacked five high (wherever floor strength permits), and the narrowest aisle space permissible for reasonable access (about 4 feet), they occupy 168,000 square feet of floor space.

II. APPROPRIATIONS.

Congress has made the following appropriation:

For the completion, preservation, and transportation of the records: That not to exceed \$3,500,000 of the unexpended balances on June 30, 1919, of the appropriations "Registration and selection for military service, fiscal year 1919," contained in the Army appropriation act for 1919, approved July 9, 1918, and the deficiency appropriation act for 1919, approved November 4, 1918, are reappropriated and made available for the fiscal year 1920, for all expenses necessary for the completion, preservation, and transportation of the records pertaining to the draft under the act entitled "An act to authorize the President to increase temporarily the Military Establishment of the United States," approved May 18, 1917, including the employment of the necessary clerical and other help for duty in the office of The Adjutant General of the Army in connection with the arrangement, operation, and maintenance of the files of those records. *Provided*, That such part of this appropriation as may be necessary shall be available for the employment of clerical help required to furnish to the adjutants general of the several States statements of service of all persons from those States who entered the military service during the war with Germany.

This seems to be a very moderate appropriation, since it was estimated by the Provost Marshal General that to continue the local boards in operation would cost \$600,000 per month.

THE INSPECTOR GENERAL'S DEPARTMENT.

The annual report of the Inspector General of the Army (an accompanying document to this report) gives a very interesting account of the activities of this department not only for the fiscal year 1919 but also for the two preceding fiscal years.

Reports of inspections made by officers of this department are particularly valuable in that they habitually present an entirely unbiased and independent view of the matter in hand. Their inspections embraced every phase of military activity, such as the organized combat divisions, Coast Artillery, aviation fields, mobilization and other camps, general and base hospitals, remount depots, Transport Service, ports of embarkation, service schools, the military arsenals and depots of all kinds, and the disciplinary barracks, including food and its preparation, instruction and training, discipline, equipment, clothing, supply and administration, records of all kinds, public and semipublic funds, and the efficiency and fitness of officers of all grades.

MEDICAL DEPARTMENT.

The report of the Surgeon General presents in great detail the medical history of the Army during the war, but no report can do justice to the triumph which the medical profession has achieved in its ministry of prevention and cure to our soldiers. The Surgeon General very properly refers to the assistance rendered to the department by the various associated organizations which devoted their

great influence to the welfare and humanitarian interest of the fighting forces. The services of these societies covered every field of our military activity and followed the soldiers from their homes to the front line trench and back to their homes; sometimes by the more or less uneventful route which led merely to the training camp and back, but more often the societies were called upon to follow the soldier through the training camp, across the sea into battle, and to bring him home through casualty dressing stations, evacuation hospitals, base hospitals and convalescent camps, and to adapt their services to his needs as he sought not only to recover shattered health, but to learn a new vocation or cultivate a new skill upon which to rely as a means of livelihood and in substitution of a craft once chosen but now made impossible by injuries received at the front. Of the work of these agencies I desire to speak in another place.

Upon the medical profession proper, of course, extreme demands were made. The Medical Corps increased from 833 officers to 30,591. Before the war the full strength of the Medical Department, including commissioned officers, contract surgeons, Army nurses, and civilian employees, numbered about 8,634. The maximum reached by this personnel, however, during the war was 372,505, so that the Medical Department alone comprised a strength practically three times as great as the entire standing Army a few years before the beginning of the war. The force of trained nurses was increased from 403 to 21,480. These figures are impressive enough as a mere study of expansion, but in a technical service like the Medical Department they present problems of organization, supervision, and control which are quite unknown under any other circumstances.

The medical profession of the country grouped itself around the Surgeon General with devotion and unanimity. Leaders in general medicine, general surgery, and the specialists in both branches of the science left their private practices and great hospital positions to accept any service available with the Army, and they were followed by the younger men in all branches of the profession, so that the chief problem of the Surgeon General was rather not to rob the communities at home of their entire medical reliance than to seek fresh accessions to his own force. Indeed, it was necessary to cooperate very fully with State boards of health, the medical societies, and the Public Health Service in the interest of retaining in America a proper distribution of medical and surgical men to meet the daily needs of the people.

But the Army doctor must needs have much knowledge of a semi-military sort. The practice of his profession among his patients must be made to integrate with the military organization. Supplies are furnished to him by a system with which, in civil life, he is unfamiliar. The vast emergency hospitals in which he is called to

serve, accommodating frequently several thousand patients, must be organized and systematized, and each doctor's duty must be a part of that system and fit into that organization, if there is to be order and the best chance for the sick.

The emergency medical officers who came from civil life had all this to learn, and they had to learn to move with a moving army, and to improvise facilities in bomb-proofs and on the battlefield itself where they were in contact with the moving and fighting military organization and where the first duty was the success of the military movement. Here the changing fortunes of battle might interrupt vital operations and call upon the medical officer to shepherd his injured patients by the quick command of transport to a safer place behind the lines.

The task of the Surgeon General's Department, therefore, was delicate and difficult beyond the mere expansion of numbers indicated by the figures before quoted.

The hospital facilities in this country were expanded from the needs of an army of less than 100,000 to the needs of one of nearly 2,000,000 men, and ample as the original provision seemed to be the influenza epidemic overcrowded the hospitals and called for the provision of emergency facilities. In the American Expeditionary Forces hospitals were taken over from the French and emergency hospitals built until an aggregate bed capacity of 300,000 was provided, making in hospitals, convalescent camps, and the evacuation hospitals in the zone of the armies provision for 15 out of every 100 men in the American Army in France. In hospital centers, as they were called in France, numbers of base hospitals were grouped together, some centers having a capacity of more than 25,000 patients.

The facilities provided by the Medical Department were of the most modern and approved kind, and the restorative procedures developed and applied were amazing in their daring as well as in the results accomplished. Restoration to usefulness of arms and legs by bone-grafting processes has saved thousands of soldiers from amputations, and given them practically complete use of limbs shattered, and in part shot away. The work done in facial restoration is especially striking. From photographs of soldiers whose faces had been utterly disfigured, sculptors constructed plaster models of the soldier's appearance before his injury. The surgeons then robbed his ribs of cartilage and bone, and various portions of his body of tissue, and reconstructed the marred face until shocking disfigurement gave place to a restored countenance with here and there a delicate scar line which concealed the processes, but revealed the skill of the surgeon who had wrought the miracle.

But the doctor's task shown in its highest expression of skill and daring in these procedures was required also in the elimination of

the physically unfit at the point of entrance into the Army. The development of those having slight defects in order to conserve the man power available for military use, and the vast and beneficent processes of preventive medicine of which the results only appear in statistical tables, can be seen only by those who realize what might have been had sanitary science not safeguarded the soldier from "the pestilence that walketh in darkness."

The work of caring for the sick and wounded was, as the Surgeon General remarks, a tremendous undertaking. During the year covered by his report the total number of sick officers and enlisted men who required hospital treatment or treatment in quarters was 2,833,204, and this number does not include soldiers treated for minor ailments, nor does it include civilians of various kinds attached to the medical personnel and receiving the attention of medical officers. Of this great number 2,422,363 cases resulted from disease, 182,789 from ordinary injuries, and 228,053 from battle injuries. Great as this number is, it is interesting to note that if the same admission rates had prevailed during 1917-18 as during the first two years of the Civil War there would have been 9,759,847 admissions from disease alone, and had the same rate obtained as during the Spanish War and the Philippine Insurrection in 1898-99, the disease admissions would have been 6,385,683. The Surgeon General justly remarks: "It may then be said that preventive medicine resulted in the saving of 6,869,571 cases of sickness as compared with the Civil War, and 3,495,407 as compared with the Spanish-American War." There has been no other equally spectacular demonstration either of the advance of medicine as a science or the incalculable benefit to mankind of preventive medicine. With this result before us, the public will appreciate the possibilities of the Public Health Service, and of the work done by State and municipal boards of health in a way which no other lesson could have taught.

The influenza epidemic, or pandemic, as it is significantly called by medical men, swept through the world with unprecedented swiftness and fatality. It was not a camp-born or camp-bred disorder, but attacked soldiers and civilians alike, and presented at once the most baffling and the most menacing disease problem of the war. Although the epidemic was of relatively brief duration, it caused 31.82 per cent of the total cases of sickness in the Army among officers and 28.26 per cent of the total cases of sickness among enlisted men.

It is difficult to say with certainty what proportion of the deaths from disease were due to influenza as it ran off into complications of pneumonia, the latter being the immediate cause of death. Pneumonia also occurred, however, as a consequence of measles and other contagious diseases, and, of course, frequently followed traumatism.

Had this great pandemic not occurred, the disease rate and the death rate from disease in the Army would have continued as it was throughout most of the war period—far lower than the normal disease and death rate in the United States, or even in the great cities of the United States best provided with sanitation and medical supervision. The following table indicates how the enforcement of sanitary measures during this war has reduced the number of deaths as compared with those during the Civil War and the Spanish-American War. It also shows conclusively that deaths from the so-called “camp diseases” (typhoid fever, malaria, and dysentery) have practically been eliminated:

	Number of deaths that occurred in present war, Sept. 1, 1917–May 2, 1919. Average strength, approximately 2,121,396.	Number of deaths that would have occurred if the Civil War death rate had obtained.	Number of deaths that would have occurred if the Spanish-American War death rate had obtained.
Typhoid fever.....	213	51,133	68,164
Malaria.....	13	¹ 13,951	11,317
Dysentery.....	² 42	² 63,898	² 6,382
Smallpox.....	5	9,536	37
Pneumonia.....	³ 41,747	³ 38,962	³ 6,086
Scarlet fever.....	167	112	222
Diphtheria.....	100	1,183	149
Tuberculosis.....	1,220	9,574	⁴ 631
Meningitis.....	2,137	3,859	4,081
Other diseases.....	3,768	34,881	15,587
Total for disease.....	49,412	227,094	112,656

¹ Includes malaria and remittent and congestive fevers.

² Includes dysentery and diarrhea.

³ Includes deaths listed from measles, influenza, empyema, inflammation of the lungs, and pleurisy, as well as pneumonia.

⁴ Rate low due to short period of war, that the war was during summer months, and tuberculosis sufferers were discharged as soon as diagnosed.

At no time in our history have we ever had so comprehensive a survey of the health of the young men of our country. Every man inducted into the service or presented for induction was examined. The examinations, of course, followed the same course in each case. The health record of each inducted man was kept, and upon discharge a final examination was made and its results recorded. These records are, of course, voluminous, (as yet not completely studied) and they contain the basis for conclusions and guides to future action of the highest importance. Already, however, some observations based upon this survey can be safely made.

A partial analysis shows that out of 2,510,000 men between 21 and 30 years of age examined by local boards, 730,000, or 29.1 per cent, were rejected on physical grounds. Often the defect had not previously been known by the individual. Where the defect was by

reason of disease the thoughtful individual without doubt placed himself under the care of a physician, to the consequent improvement in the national health. An extensive survey was made to determine the presence of intestinal parasites. It is of interest to note that of over half a million soldiers who received careful microscopical examinations, about 70,000 showed the presence of one or more intestinal parasites, and of these about 60,000 were infested with hookworms. These men were placed under treatment and ultimately returned to their communities freed from these disabling parasites.

Aside from the great benefit to the health of the Nation by the individual taking home with him and transmitting to his family and fellow citizens the lessons in sanitation and personal hygiene which he had learned during his Army service, the physical improvement in the soldier himself has been remarkable. Increase in girth and chest expansion was particularly noticeable. Sanitary inspectors have remarked on the awkward, narrow-chested, and flabbily muscled men who arrived at mobilization camps and the bronzed, erect, and broad-chested soldiers with fine muscular development and characteristically alert and self-confident air who were discharged on demobilization. It is estimated that the average gain in weight in the first year of military service was from 15 to 20 pounds, and there is no doubt that this increase in weight was almost entirely in muscular tissues.

On return to civil pursuits the added physical vigor of the discharged soldier will stimulate a desire for more active outdoor exercise, which will make for better health of the individual and a consequent higher type of citizenship. The resulting benefits to the American Nation can not be overestimated.

Out of these statistics we should in general derive three kinds of information. First, the geographical and industrial distribution of causes for rejection. Already we have been able to plot upon a map the group of States having the smallest percentages of rejections; generally speaking, they extend north and south through the middle of the country. Similarly, we have been able to show the States in groups having progressively larger percentages of rejections. No hasty generalization should be made on this subject, but careful study will produce fairly reliable results, since the mass of material is so great and so generally fair to all sections of the country. When these studies are made it will be possible to know just how far the congestion of the modern city is prejudicial to the best physical development of growing boys and men, and how far certain trades and occupations, or certain ranges of hours of labor in industry, or certain minimum age limits for entrance into industrial occupations affect the full and healthy development of the bodies of workers.

Second, we shall learn very important things about the prevalence of mental defects. Already very startling relationships have been

disclosed between low-grade mentality and delinquency. The tests for Army admission will endeavor, of course, to exclude the real defective; but we have learned from our Army experience that many boys in ordinary times are a bit queer to their families and neighbors without being suspected of serious mental defects. They grow from childhood through a process which adapts their environment to their peculiarities and tends to make easy for them the social accommodations necessary. They, on the other hand, learn the limits of their own capacity and accept the accommodations indulgently made for them by their neighbors; and thus, beyond being deemed dull or queer, they suffer no noticeable hardship. When they are drafted into the military service, however, they are taken out of the accommodating environment and brought into a new social group which has had no experience with their peculiarities and, at the outset, makes no allowances for them. They, in turn, find the normal expectation of conduct to be less accommodating to their limitations and so find themselves failing to fit in, thus accenting, or rather revealing to full view, the extent of their departure from normal. Many such peculiarities are due to lack of training, or education, or proper nutrition, or easily corrigible physical defects, and the discovery of the condition and its cause leads often to an easy application of remedies which remove a handicap that otherwise might have been regarded and accepted as a permanent limitation.

Third, the study of these statistics will undoubtedly profoundly affect the physical habits of men. It is not possible to see the robustness which ordered and systematic habits of life cause without wishing at once to bring about the benefits of such habits to youth everywhere. We shall undoubtedly be more regular in our hours of work, recreation and sleep, in our meals, both as to their time and nutritive value, and we shall live more in the open, with the result that the next generation of boys will start from a higher physical plane and accept naturally, and as a lesson of experience, the regimen which has been seen to build up and strengthen the bodies of the young men in this great army.

Fortunately, the relations established in this war between the medical services of the Government have been most intimate and helpful. The medical men of the Army and the Navy and the Public Health Service have practically divided among them the entire medical profession of the country, and the new sciences of applied psychology and psychiatry have been brought in by the association of the most eminent specialists with the medical services. This great body of facts, therefore, contains not only the accumulated observations of the older strictly medical and surgical men, but the diagnoses of the psychiatrists and the subtle suggestions as to both cause and remedy of the psychologists and sociologists.

We may be assured, therefore, that the data collected will be studied not only for the answers to the more or less obvious questions suggested above, but for many other contributions to our knowledge of youth and its problems, physical and mental, and this great survey of the man power of the United States will undoubtedly add rich generalizations which can be used in the Army and in civil life to conserve our man power and thus multiply our industrial, physical, and moral strength as a people.

INSULAR AFFAIRS.

The people of the Philippine Islands have continued to make progress in self-government under the new organic act of August 29, 1916. The desire for the complete independence of the Philippine Islands was expressed by the Philippines Independence Commission which visited Washington in April of this year.

Under the new organic act of Porto Rico (approved Mar. 2, 1917), the people of that island have made satisfactory progress in running their own government as American citizens. In October, 1918, the island suffered a disastrous earthquake shock followed by a tidal wave, and a severe epidemic of influenza in November and December, 1918. These unfortunate occurrences were a severe setback in the upward trend of prosperity in Porto Rico, but measures for recovery are being taken.

The manner in which Porto Rico and the Philippines met all the demands made upon them incident to the World War was most gratifying.

A more detailed account of these matters will be found in the Annual Report of the Acting Chief of the Bureau of Insular Affairs.

MILITIA BUREAU.

During the fiscal year, 1919, the Militia Bureau was charged, in addition to its usual duties with the National Guard not in Federal service, with matters pertaining to the United States Guards of the United States Army, and with matters pertaining to strictly State forces or Home Guards, equipped under Special Regulations 37.

The National Guard, recognized as such previous to August 5, 1917, was absorbed into the United States Army during this entire period, and the National Guard was at its lowest ebb during the period covered by this report. A few organizations failed to qualify as National Guard in time to be inducted into Federal service August 5, 1917. The operation of the selective service act, however, interfered so seriously with the retention of the personnel of National Guard organizations, particularly after the draft age was extended to 45, that it was almost an impossible task to retain in the States a

National Guard under the act of June 3, 1916. As soon as the armistice was declared, November 11, 1918, schemes for demobilization were at once put into effect. The Militia Bureau made every effort to encourage the organization of National Guard units between the dates of November 11, 1918, and June 30, 1919. Because of the limited amount of money available for the purchase of equipment, and in order to meet an emergency by securing a great number of small armed forces located throughout the States, the strength for Federal recognition was reduced, but this reduction did not secure organizations of the National Guard as rapidly as expected, the strength on June 30, 1919, being 1,198 officers and 36,012 men. The failure of the appropriation bill to pass the Sixty-fifth Congress further hampered the development of National Guard units.

Efforts were concentrated upon a revision and compilation of National Guard Regulations issued under the act of June 3, 1916, from time to time as problems arose. This work was virtually ready for the printer by June 30, 1919.

The Militia Bureau on May 14, 1919, initiated a movement to establish a school of instruction at the Infantry School at Camp Benning, Ga., for specially selected men; under date of June 11, 1919, an order was issued directing the establishment of this school with an attendance of 150 students.

The United States Guards of the United States Army continued to develop until the date of the armistice, attaining a strength of 48 battalions, 1,194 officers, and 25,068 enlisted men. Shortly after the armistice the control of the United States Guards was by order turned over to the department commanders in whose department the Guards were serving. The demobilization of this force was ordered on November 29, 1918. The records of the United States were kept in this bureau until March 17, 1919, at which time they were turned over to The Adjutant General's Office, where they are at the present time. The force was utilized in 32 States and the District of Columbia and at 338 separate places.

By order of the Secretary of War, on February 14, 1919, this bureau was charged with the supervision of matters pertaining to strictly State forces or home guard, equipped under Special Regulations 37, while the issues of material were actually made by the Ordnance Department. As nearly as can be determined, there were 78,008 rifles issued for use of Home Guards to June 30, 1919. Some States procured equipment by purchases from State funds. No record is available as to the amount of equipment thus procured.

The reports received from individual States concerning State forces give the organizations, but unfortunately not the strength of each. It is estimated that the State forces furnished equipment from Federal funds did not exceed 79,000 men.

THE PANAMA CANAL.

There still remains work to be done to bring the Panama Canal to completion within the original plans. Relatively small amounts of excavation within the prism of the canal itself are necessary, but substantial quantities of earth must be dredged annually in maintenance, and extensive work of construction within the Canal Zone is still to be carried out before it can be felt that the facilities for the maintenance and operation of this great waterway are adequately provided.

The canal, of course, has now been opened and in use for several years, and its formal opening will shortly be observed with ceremonies appropriate to the completion of one of the great engineering undertakings of history. The commerce of the world now rides from ocean to ocean without accident or inconvenience through a strip of country which once baffled the ingenuity of the world's greatest engineers with its apparently unconquerable difficulties and laid waste, by its tropical and insanitary conditions, armies of men who sought to build a canal there.

To be sure the canal was at its original conception a commercial undertaking, the prospective profits of which were too remote for successful private financing. The credit of the Government of the United States removed this cause of failure, but there remains to the credit of the United States a demonstration of superb engineering daring and skill on the one hand and on the other a triumph for the American medical profession which has eradicated the menace of yellow fever, restrained the usual tropical and other diseases within normal proportions, and rendered the zone so sanitary that perhaps nowhere else in the world is life in the Tropics approximately so safe.

Meanwhile in building the canal we have built up a distinct industrial civilization in this strip of American territory. The amount appropriated for the construction of the canal and its immediate adjuncts totals approximately \$380,000,000, of which \$372,000,000 has been expended for construction. The tolls collected during the present fiscal year amount to \$6,149,598.54. Had a juster system of measurement for tolls been in force the receipts would have aggregated \$7,017,125.02. Such a system of measurement has been carefully worked out and presented to the Congress, and the bill introduced to authorize its enforcement has already passed the House of Representatives.

The total number of ships making the transit of the canal during the fiscal year 1919 was 2,025, of which 860 passed from the Atlantic to the Pacific and 1,165 from the Pacific to the Atlantic. Their aggregate net tonnage, according to Panama Canal rules of measurement, was 6,131,575 tons, and the cargo carried by them aggregated 6,877,649 long tons. In addition to this, 186 vessels of the United States Navy passed through the canal during the year.

Commercial traffic through the canal during the year showed a decrease of 4.93 per cent in the number of ships, 7.92 per cent in gross tonnage, and 9.05 per cent in cargo carried as compared with the preceding year. This, however, in view of conditions caused by submarine warfare and the peremptory demands made upon the shipping of the world for the transportation of American troops and supplies to France, is a remarkably good showing, and with the reestablishment of the ocean trade routes of the world the usefulness of the canal can be expected to grow from year to year. This growth will, of course, be accelerated by the more general distribution of knowledge about the canal itself. Shippers everywhere know of the existence of the canal, but there is little comprehension of the extraordinary facilities created there for the supplying and repairing of ships in transit. Shipowners and shipmasters must be assured that supplies of coal, oil, and subsistence can be procured and necessary repairs made before they will be willing to resort to a place so far removed from the sources of supply upon which they have been accustomed to rely along the old trade routes established and built up through centuries of use. The fact is that the great docks and shops in the Canal Zone are able to berth and repair the largest ships now used in ocean traffic, and even during the stress of war it was found possible to maintain adequate stocks of coal, oil, and supplies for the use of public and commercial vessels making the transit of the canal.

The number of employees on the Isthmus on June 30, 1919, was 20,361, of whom 3,290 were on the so-called gold roll, and 17,071 on the silver roll—a somewhat larger number than on June 30 of the preceding year, the increase being due to the repair work on shops and construction undertaken by the Government for the permanent housing of a part of the garrison.

No serious labor controversies have arisen, although the increased cost of living which has affected labor generally has led the representatives of the canal employees to urge increases in those basic rates of pay in the United States upon which the determination of wages in the Canal Zone is based.

Careful observations made throughout the year upon established points indicate that there has been no movement in the hills at which the great slides of the past have occurred. There have been 46 seismic disturbances of a minor character but no damage to the canal or appurtenant works. We may, therefore, regard the physical and commercial future of the canal as fairly assured, and after its formal opening can take up its permanent administration and operation.

It has always been necessary to maintain schools, hospitals, public facilities for recreation, and to carry on as Government enterprises the means of subsistence supply. It is not right to ask men to live in the Tropics, practically on a Government reservation, devoted

to the performance of work of this character, without providing for them and their families compensating advantages to those which are surrendered at home. It would not be possible to secure the necessary manual and mechanical personnel without constant attention to these needs, but it ought to be possible, as the work of construction reaches completion, to bring about a reduction in the number of employees, and institute some rules with regard to length of service in the Canal Zone which will prevent the nervous and physical breakdown which occurs among people from the temperate zones who live too long in the Tropics.

CIVILIAN PERSONNEL.

In connection with the building up of the immense civilian force which was necessary to handle the activities of the war here in Washington and elsewhere throughout the United States I desire to express my appreciation of the untiring and efficient efforts of the Civil Service Commission.

During the entire war the department and the commission have worked in helpful cooperation. The commission through its various representatives scattered throughout the country recruited many thousands of civilian employees, examined into their qualifications, and also into the qualifications of other thousands recruited by various bureaus of the department in cooperation with the commission and otherwise. It is doubtful whether this important work could have been performed satisfactorily by the department without the aid of the commission; certainly not except at great inconvenience and probably vastly greater expense. The results have justified and strengthened the department's confidence in the efficiency of the civil-service system and the principle upon which it is founded, namely, the selection of employees upon merit as ascertained by the application of standard tests of fitness.

FINANCIAL OPERATIONS.

Among the financial problems which confronted the War Department during the war and after the signing of the armistice were (a) the expeditious payment of troops upon demobilization; (b) the prompt payment of the sick and wounded who arrived in the United States from battle fields and hospitals without the usual records; (c) the payment of the bonus of \$60 to discharged soldiers authorized by Congress after more than 1,500,000 soldiers were discharged; (d) the prompt payment of merchants' bills; (e) the consolidation of funds in Europe to prevent an undue accumulation of balances in the hands of numerous disbursing officers; (f) the application of rates of exchange without any undue loss to the Government; (g) the sale of Liberty loan bonds to the soldiers. As these very interesting problems are discussed succinctly in the report submitted to me by the Director of Finance, it is attached hereto in full as Appendix E.

CONCLUSION.

In the foregoing I have necessarily omitted reference to the work of the great bureaus of the department and bodies of men and individuals which have been in themselves spectacular as instances of successful organization and devotion to the national interests. The reports of the chiefs of such bureaus are of course a part of the official literature of the war. In cases such as that of the Ordnance Department a volume would be required adequately to describe the complexity of the task undertaken, the ingenuity of the means used to meet the task, and the success achieved.

The relations of the War Department to the other great executive departments of the Government have been cordial, and the help extended to the War Department by the scientific bureaus either associated with other departments or independently organized has been an indispensable part of the work done.

In transmitting these reports I feel that they are the raw material out of which history will be written and out of which in time will emerge a faithful picture of the unselfishness and devotion with which public officers and private citizens have cooperated to achieve success. The early struggles of the War Department with its inadequate peace-time organization resulted in an effective machine for the training of men and the production of supplies. The success which Gen. Pershing achieved in Europe rested for its foundation upon the work done in America.

Necessarily the Secretary of War has had to rely upon his associates, military and civil, to accomplish in their respective fields their parts of these great undertakings. On the military side I would be wanting were I to fail to refer to the broad imagination, the unremitting energy, the firmness of purpose with which the Chief of Staff, General March, has pressed forward the program. Without his strength and vision much that was done could not have been done either so soon or so well. As it is I can only record the successful conclusion of the Great War, the splendid efficiency of America's participation, and an enlightened treatment of post-war problems which has gone far to restore the industry and commerce of the country and to close up our financial and business relations in an harmonious and satisfactory way.

These great results have been achieved by American soldiers and American citizens under the guidance of their Commander in Chief.

Respectfully,

NEWTON D. BAKER,
Secretary of War.

FINAL REPORT OF GEN. JOHN J. PERSHING.

GENERAL HEADQUARTERS AMERICAN EXPEDITIONARY FORCES,
September 1, 1919.

To the SECRETARY OF WAR.

SIR: I have the honor to submit herewith my final report as Commander-in-Chief of the American Expeditionary Forces in Europe.

PART I.

PERIOD OF ORGANIZATION.

1. I assumed the duties of this office on May 26, 1917, and, accompanied by a small staff, departed for Europe on board the S. S. *Baltic* May 28. We arrived at London on June 9 and, after spending some days in consultation with the British authorities, reached Paris on June 13.

2. Following the rather earnest appeals of the Allies for American troops, it was decided to send to France, at once, 1 complete division and 9 newly organized regiments of Engineers. The division was formed of regular regiments, necessary transfers of officers and men were made, and recruits were assigned to increase these units to the required strength.

The offer by the Navy Department of one regiment of Marines to be reorganized as Infantry was accepted by the Secretary of War, and it became temporarily a part of the First Division.

Prior to our entrance into the war, the regiments of our small army were very much scattered, and we had no organized units, even approximating a division, that could be sent overseas prepared to take the field. To meet the new conditions of warfare an entirely new organization was adopted in which our Infantry divisions were to consist of 4 regiments of Infantry of about treble their original size, 3 regiments of Artillery, 14 machine-gun companies, 1 Engineer regiment, 1 Signal battalion, 1 troop of Cavalry, and other auxiliary units, making a total strength of about 28,000 men.

MILITARY SITUATION.

3. In order that the reasons for many important decisions reached in the early history of the American Expeditionary Forces may be more clearly understood and the true value of the American effort more fully appreciated, it is desirable to have in mind the main events leading up to the time of our entry into the war.

1914.

4. Although the German drive of 1914 had failed in its immediate purpose, yet her armies had made very important gains. German forces were in complete possession of Belgium and occupied rich industrial regions of northern France, embracing one-fourteenth of her population and about three-fourths of her coal and iron. The German armies held a strongly fortified line 468 miles in length, stretching from the Swiss border to Nieuport on the English Channel; her troops were within 48 miles of Paris and the initiative remained in German hands.

In the east the rapidity of the Russian mobilization forced Germany, even before the Battle of the Marne, to send troops to that frontier, but the close of 1914 found the Russian armies ejected from East Prussia and driven back on Warsaw.

The entry of Turkey into the war, because of the moral effect upon the Moslem world and the immediate constant threat created against Allied communications with the Far East, led to an effort by the Allies in the direction of the Dardanelles.

1915.

5. Italy joined the Allies in May and gave their cause new strength, but the effect was more or less offset when Bulgaria entered on the side of the Central Powers.

The threatening situation on the Russian front and in the Balkans was still such that Germany was compelled to exert an immediate offensive effort in those directions and to maintain only a defensive attitude on the western front. German arms achieved a striking series of successes in the vicinity of the Mazurian Lakes and in Galicia, capturing Warsaw, Brest-Litovsk, and Vilna. The Central Powers overran Serbia and Montenegro. Meanwhile, the Italian armies forced Austria to use approximately one-half of her strength against them.

In the west, the French and British launched offensives which cost the German armies considerable loss; but the objectives were limited and the effect was local.

The Dardanelles expedition, having failed in its mission, was withdrawn in January, 1916. In Mesopotamia the Allied operations had

not been successful. Although the British fleet had established its superiority on the sea, yet the German submarine blockade had developed into a serious menace to Allied shipping.

1916.

6. Germany no doubt believed that her advantage on the eastern front at the close of 1915 again warranted an offensive in the west, and her attack against Verdun was accordingly launched in the spring of 1916. But Russia was not yet beaten and early in June, aided at the same time by the threat of an Italian offensive in the west, she began the great drive in Galicia that proved so disastrous to Austria.

Roumania, having entered on the side of the Allies, undertook a promising offensive against Austria. The British and French Armies attacked along the Somme. Germany quickly returned to the defensive in the west, and in September initiated a campaign in the east which, before the close of 1916, proved unfortunate for Russia as well as Roumania.

SPRING OF 1917.

7. Retaining on the eastern front the forces considered sufficient for the final conquest of Russia, Germany prepared to aid Austria in an offensive against Italy. Meanwhile, the Russian revolution was well under way and, by the midsummer of 1917, the final collapse of that government was almost certain.

The relatively low strength of the German forces on the western front led the Allies with much confidence to attempt a decision on this front; but the losses were very heavy and the effort signally failed. The failure caused a serious reaction especially on French morale, both in the army and throughout the country, and attempts to carry out extensive or combined operations were indefinitely suspended.

In the five months ending June 30, German submarines had accomplished the destruction of more than three and one-quarter million tons of Allied shipping. During three years Germany had seen practically all her offensives except Verdun crowned with success. Her battle lines were held on foreign soil and she had withstood every Allied attack since the Marne. The German general staff could now foresee the complete elimination of Russia, the possibility of defeating Italy before the end of the year and, finally, the campaign of 1918 against the French and British on the western front which might terminate the war.

It can not be said that German hopes of final victory were extravagant, either as viewed at that time or as viewed in the light of

history. Financial problems of the Allies were difficult, supplies were becoming exhausted and their armies had suffered tremendous losses. Discouragement existed not only among the civil population but throughout the armies as well. Such was the Allied morale that, although their superiority on the western front during the last half of 1916 and during 1917 amounted to 20 per cent, only local attacks could be undertaken and their effect proved wholly insufficient against the German defense. Allied resources in man power at home were low and there was little prospect of materially increasing their armed strength, even in the face of the probability of having practically the whole military strength of the Central Powers against them in the spring of 1918.

8. This was the state of affairs that existed when we entered the war. While our action gave the Allies much encouragement yet this was temporary, and a review of conditions made it apparent that America must make a supreme material effort as soon as possible. After duly considering the tonnage possibilities I cabled the following to Washington on July 6, 1917:

Plans should contemplate sending over at least 1,000,000 men by next May.

ORGANIZATION PROJECTS.

9. A general organization project, covering as far as possible the personnel of all combat, staff, and administrative units, was forwarded to Washington on July 11. This was prepared by the Operations Section of my staff and adopted in joint conference with the War Department Committee then in France. It embodied my conclusions on the military organization and effort required of America after a careful study of French and British experience. In forwarding this project I stated:

It is evident that a force of about 1,000,000 is the smallest unit which in modern war will be a complete, well-balanced, and independent fighting organization. However, it must be equally clear that the adoption of this size force as a basis of study should not be construed as representing the maximum force which should be sent to or which will be needed in France. It is taken as the force which may be expected to reach France in time for an offensive in 1918, and as a unit and basis of organization. Plans for the future should be based, especially in reference to the manufacture of artillery, aviation, and other material, on three times this force—i. e., at least 3,000,000 men.

The original project for organized combat units and its state of completion on November 11, 1918, are shown in the charts appended to this report. With a few minor changes, this project remained our guide until the end.

10. While this general organization project provided certain Services of Supply troops, which were an integral part of the

larger combat units, it did not include the great body of troops and services required to maintain an army overseas. To disembark 2,000,000 men, move them to their training areas, shelter them, handle and store the quantities of supplies and equipment they required called for an extraordinary and immediate effort in construction. To provide the organization for this purpose, a project for engineer services of the rear, including railways, was cabled to Washington August 5, 1917, followed on September 18, 1917, by a complete service of the rear project, which listed item by item the troops considered necessary for the Services of Supply. Particular attention is invited to the charts herewith, which show the extent to which this project had developed by November 11, 1918, and the varied units required, many of which did not exist in our Army prior to this war.

11. In order that the War Department might have a clear-cut program to follow in the shipment of personnel and material to insure the gradual building up of a force at all times balanced and symmetrical, a comprehensive statement was prepared covering the order in which the troops and services enumerated in these two projects should arrive. This schedule of priority of shipments, forwarded to the War Department on October 7, divided the initial force called for by the two projects into six phases corresponding to combatant corps of six divisions each.

The importance of the three documents, the general organization project, the service of the rear project, and the schedule of priority of shipments should be emphasized, because they formed the basic plan for providing an army in France together with its material for combat, construction, and supply.

AMERICAN FRONT AND LINE OF COMMUNICATIONS.

12. Before developing plans for a line of communications it was necessary to decide upon the probable sector of the front for the eventual employment of a distinctive American force. Our mission was offensive and it was essential to make plans for striking the enemy where a definite military decision could be gained. While the Allied Armies had endeavored to maintain the offensive, the British, in order to guard the Channel ports, were committed to operations in Flanders and the French to the portion of the front protecting Paris. Both lacked troops to operate elsewhere on a large scale.

To the east the great fortified district east of Verdun and around Metz menaced central France, protected the most exposed portion of the German line of communications, that between Metz and Sedan, and covered the Briey iron region, from which the enemy

obtained the greater part of the iron required for munitions and material. The coal fields east of Metz were also covered by these same defenses. A deep advance east of Metz, or the capture of the Briey region, by threatening the invasion of rich German territory in the Moselle Valley and the Saar Basin, thus curtailing her supply of coal or iron, would have a decisive effect in forcing a withdrawal of German troops from northern France. The military and economic situation of the enemy, therefore, indicated Lorraine as the field promising the most fruitful results for the employment of our armies.

13. The complexity of trench life had enormously increased the tonnage of supplies required by troops. Not only was it a question of providing food but enormous quantities of munitions and material were needed. Upon the railroads of France fell the burden of meeting the heavy demands of the three and one-half million Allied combatants then engaged.

The British were crowding the Channel ports and the French were exploiting the manufacturing center of Paris, so that the railroads of northern France were already much overtaxed. Even though the Channel ports might be used to a limited extent for shipments through England, the railroads leading eastward would have to cross British and French zones of operation, thus making the introduction of a line of communications based on ports and railways in that region quite impracticable. If the American Army was to have an independent and flexible system it could not use the lines behind the British-Belgium front nor those in rear of the French front covering Paris.

The problem confronting the American Expeditionary Forces was then to superimpose its rail communications on those of France where there would be the least possible disturbance to the arteries of supply of the two great Allied armies already in the field. This would require the utmost use of those lines of the existing French railroad system that could bear an added burden. Double-track railroad lines from the ports of the Loire and the Gironde Rivers unite at Bourges, running thence via Nevers, Dijon, and Neufchateau, with lines radiating therefrom toward the right wing of the Allied front. It was estimated that these with the collateral lines available, after considerable improvement, could handle an additional 50,000 tons per day, required for an army of 2,000,000 men. The lines selected, therefore, were those leading from the comparatively unused south-Atlantic ports of France to the northeast where it was believed the American Armies could be employed to the best advantage.

14. In the location of our main depots of supply, while it was important that they should be easily accessible, yet they must also be at

a safe distance, as we were to meet an aggressive enemy capable of taking the offensive in any one of several directions. The area embracing Tours, Orleans, Montargis, Nevers, and Chateauroux was chosen, as it was centrally located with regard to all points on the arc of the western front.

The ports of St. Nazaire, La Pallice, and Bassens were designated for permanent use, while Nantes, Bordeaux, and Pauillac were for emergency use. Several smaller ports, such as St. Malo, Sables-d'Olonne, and Bayonne, were available chiefly for the importation of coal from England. From time to time, certain trans-Atlantic ships were sent to Le Havre and Cherbourg. In anticipation of a large increase in the amount of tonnage that might be required later, arrangements were made during the German offensive of 1918 to utilize the ports of Marseilles and Toulon as well as other smaller ports on the Mediterranean.

For all practical purposes the American Expeditionary Forces were based on the American Continent. Three thousand miles of ocean to cross with the growing submarine menace confronting us, the quantity of ship tonnage that would be available then unknown and a line of communications by land 400 miles long from French ports to our probable front presented difficulties that seemed almost insurmountable as compared with those of our Allies.

15. For purposes of local administration our line of communications in France was subdivided into districts or sections. The territory corresponding to and immediately surrounding the principal ports were, respectively, called base sections, with an intermediate section embracing the region of the great storage depots and an advance section extending to the zone of operations, within which the billeting and training areas for our earlier divisions were located.

16. In providing for the storage and distribution of reserve supplies an allowance of 45 days in the base sections was planned, with 30 days in the intermediate section and 15 days in the advance section. After the safety of our sea transport was practically assured, this was reduced to a total of 45 days, distributed proportionately. When the Armistice was signed all projects for construction had been completed and supplies were on hand to meet the needs of 2,000,000 men, while further plans for necessary construction and for the supply of an additional 2,000,000 were well under way.

GENERAL STAFF.

17. The organization of the General Staff and supply services was one of the first matters to engage my attention. Our situation in this regard was wholly unlike that of our Allies. The French Army was at home and in close touch with its civil government and

war department agencies. While the British were organized on an overseas basis, they were within easy reach of their base of supplies in England. Their problems of supply and replacement were simple as compared with ours. Their training could be carried out at home with the experience of the front at hand, while our troops must be sent as ships were provided and their training resumed in France where discontinued in the States. Our available tonnage was inadequate to meet all the initial demands, so that priority of material for combat and construction, as well as for supplies that could not be purchased in Europe, must be established by those whose perspective included all the services and who were familiar with general plans. For the proper direction and coordination of the details of administration, intelligence, operations, supply, and training, a General Staff was an indispensable part of the Army.

The functions of the General Staff at my headquarters were finally allotted to the five sections, each under an Assistant Chief of Staff, as follows: To the First, or Administrative Section—ocean tonnage, priority of overseas shipments, replacement of men and animals, organization and types of equipment for troops, billeting, prisoners of war, military police, leaves and leave areas, welfare work and amusements; to the Second, or Intelligence Section—information regarding the enemy, including espionage and counterespionage, maps, and censorship; to the Third, or Operations Section—strategic studies and plans and employment of combat troops; to the Fourth Section—coordination of supply services, including Construction, Transportation, and Medical Departments, and control of regulating stations for supply; to the Fifth, or Training Section—tactical training, schools, preparation of tactical manuals, and athletics. This same system was applied in the lower echelons of the command down to include divisions, except that in corps and divisions the Fourth Section was merged with the First and the Fifth Section with the Third.

18. As the American Expeditionary Forces grew, it was considered advisable that, in matters of procurement, transportation, and supply, the chiefs of the several supply services, who had hitherto been under the General Staff at my headquarters, should be placed directly under the supervision of the commanding general, Services of Supply. At General Headquarters, a Deputy Chief of Staff to assist the Chief of Staff was provided, and the heads of the five General Staff sections became Assistant Chiefs of Staff.

The General Staff at my headquarters thereafter concerned itself with the broader phase of control. Under my general supervision and pursuant to clearly determined policies, the Assistant Chiefs of Staff, coordinated by the Chief of Staff, issued instructions and

gave general direction to the great combat units and to the Services of Supply, keeping always in close touch with the manner and promptness of their fulfillment. Thus a system of direct responsibility was put into operation which contemplated secrecy in preparation, prompt decision in emergency, and coordinate action in execution.

19. With the growth of our forces the demand for staff officers rapidly increased, but the available number of officers trained for staff duty was very limited. To meet this deficiency, a General Staff college was organized at Langres on November 28, 1917, for the instruction of such officers as could be spared. An intensive course of study of three months was prescribed embracing the details of our staff organization and administration, and our system of supply, and teaching the combined employment of all arms and services in combat. Officers were carefully chosen for their suitability and, considering the short time available, graduates from this school returned well equipped for staff duties and with a loyal spirit of common service much accentuated. The Staff College carried to completion four courses of three months each, graduating 537 staff officers.

TRAINING.

20. Soon after our arrival in Europe careful study was made of the methods followed by our Allies in training combat troops. Both the French and British maintained continuously a great system of schools and training centers, which provided for both theoretical and practical instruction of inexperienced officers and noncommissioned officers. These centers were required not only to train new troops, but to prepare officers and soldiers for advancement by giving them a short course in the duties of their new grades. These school systems made it possible to spread rapidly a knowledge of the latest methods developed by experience and at the same time counteract false notions.

21. A similar scheme was adopted in August, 1917, for our Armies in which the importance of teaching throughout our forces a sound fighting doctrine of our own was emphasized. It provided for troop training in all units up to include divisions. Corps centers of instruction for noncommissioned officers and unit commanders of all arms were established. These centers also provided special training for the instructors needed at corps schools. Base training centers for replacement troops and special classes of soldiers, such as cooks and mechanics, were designated. The army and corps schools were retained under the direct supervision of the Training Section, General Staff. The schools mentioned graduated 21,330 noncommissioned officers and 13,916 officers.

Particular care was taken to search the ranks for the most promising soldiers, in order to develop leaders for the command of platoons and companies. There were graduated from these candidate schools in France 10,976 soldiers. It was planned to have 22,000 infantrymen under instruction by January 1, 1919, graduating 5,000 to 6,000 each month. In addition, there were to be graduated monthly 800 artillerymen, 400 engineers, and 200 signalmen, making a total of about 7,000 soldiers each month. Prior to November 14, 1918, 12,732 soldiers were commissioned as officers.

It must not be thought that such a system is ideal, but it represents a compromise between the demand for efficiency and the imperative and immediate necessity for trained replacement officers.

22. Every advantage was taken of the experience of our Allies in training officers. It was early recommended to the War Department that French and British officers be asked for to assist in the instruction of troops in the United States. Pending the organization and development of our own schools, a large number of our officers were sent to centers of instruction of the Allied armies. The training of our earlier divisions was begun in close association with the French divisions, under conditions set forth in the following paragraph on divisional training:

Trench warfare naturally gives prominence to the defensive as opposed to the offensive. To guard against this, the basis of instruction should be essentially the offensive both in spirit and in practice. The defensive is accepted only to prepare for future offensive.

For training our Artillery units, special localities such as Valdahon, Coetquidan, Meucon, and Souge, had to be sought, and the instruction was usually carried on in conjunction with French artillery followed up later, as far as possible, with field practice in cooperation with our own Infantry.

23. The long period of trench warfare had so impressed itself upon the French and British that they had almost entirely dispensed with training for open warfare. It was to avoid this result in our Army and to encourage the offensive spirit that the following was published in October, 1917:

1. * * * (a) The above methods to be employed must remain or become distinctly our own.

(b) All instruction must contemplate the assumption of a vigorous offensive. This purpose will be emphasized in every phase of training until it becomes a settled habit of thought.

(c) The general principles governing combat remain unchanged in their essence. This war has developed special features which involve special phases of training, but the fundamental ideas enunciated in our Drill Regulations, Small Arms Firing Manual, Field Service Regulations, and other service manuals remain the guide for both officers and soldiers and constitute the standard

by which their efficiency is to be measured, except as modified in detail by instructions from these headquarters.

(d) The rifle and the bayonet are the principal weapons of the infantry soldier. He will be trained to a high degree of skill as a marksman, both on the target range and in field firing. An aggressive spirit must be developed until the soldier feels himself, as a bayonet fighter, invincible in battle.

(e) All officers and soldiers should realize that at no time in our history has discipline been so important; therefore, discipline of the highest order must be exacted at all times. The standards for the American Army will be those of West Point. The rigid attention, upright bearing, attention to detail, uncomplaining obedience to instructions required of the cadet will be required of every officer and soldier of our armies in France. * * *

Recommendations were cabled to Washington emphasizing the importance of target practice and musketry training, and recommending that instruction in open warfare be made the mission of troops in the United States, while the training in trench warfare so far as necessary be conducted in France. Succeeding divisions, whether serving temporarily with the British or French, were trained as thus indicated. The assistance of the French units was limited to demonstrations, and, in the beginning, French instructors taught the use of French arms and assisted in the preparation of elementary trench warfare problems.

Assuming that divisions would arrive with their basic training completed in the United States, one month was allotted for the instruction of small units from battalions down, a second month of experience in quiet sectors by battalions, and a third month for field practice in open warfare tactics by division, including artillery. Unfortunately many divisions did not receive the requisite amount of systematic training before leaving the States and complete preparation of such units for battle was thus often seriously delayed.

24. The system of training profoundly influenced the combat efficiency of our troops by its determined insistence upon an offensive doctrine and upon training in warfare of movement. Instruction which had hitherto been haphazard, varying with the ideas and conceptions of inexperienced commanding officers and indifferent instructors, was brought under a system based on correct principles. Approved and systematic methods were maintained and enforced largely by the continual presence of members of the Training Section with the troops both during the training period and in campaign.

INTELLIGENCE.

25. Before our entry into the war, European experience had shown that military operations can be carried out successfully and without unnecessary loss only in the light of complete and reliable information of the enemy. Warfare with battle lines separated by short distances only, made possible the early acquirement of information,

such as that obtained through airplane photography, observation from balloons and planes, sensitive instruments for detecting gun positions and raids to secure prisoners and documents. All such information, together with that from Allied sources, including military, political, and economical, was collected, classified, and rapidly distributed where needed.

26. From careful studies of the systems and actual participation by our officers in methods in use at various Allied headquarters, an Intelligence Service was evolved in our forces which operated successfully from its first organization in August, 1917.

With us the simpler methods, such as observation from the air and ground and the exploitation of prisoners and documents, have proved more effective than the less direct means. Every unit from the battalion up had an intelligence detachment, but only in divisions and larger organizations did the intelligence agencies embrace all available means and sources, including radio interception stations and sound and flash-ranging detachments.

27. The subjects studied by the Intelligence Section embraced the location of the enemy's front line, his order of battle, the history and fighting value of his divisions, his manpower, his combat activities, circulation and movement, his defensive organizations, supply, construction and material, air service, radio service, strategy and tactics, and what he probably knew of our intentions. The political and economic conditions within the enemies' countries were also of extreme importance.

28. To disseminate conclusions, daily publications were necessary, such as a Secret Summary of Intelligence containing information of the broadest scope, which concerned only General Headquarters; and a Summary of Information, distributed down to include the divisions, giving information affecting the western front. A Press Review and a Summary of Air Intelligence were also published.

Maps showing graphically the disposition and movement of enemy troops in our front were the best means for distributing information to our troops. At the base printing plant and at General Headquarters base maps were prepared while mobile printing plants, mounted on trucks, accompanied corps and army headquarters. Combat troops were thus supplied with excellent maps distributed, just before and during an attack, down to include company and platoon commanders. Between July 1 and November 11, 1918, over 5,000,000 maps were used.

29. The secret service, espionage and counterespionage, was organized in close cooperation with the French and British. To prevent indiscretions in the letters of officers and soldiers, as well as in

articles written for the press, the Censorship Division was created. The Base Censor examined individual letters when the writer so desired, censored all mail written in foreign languages, of which there were over 50 used, and frequently checked up letters of entire organizations.

30. The policy of press censorship adopted aimed to accomplish three broad results:

To prevent the enemy from obtaining important information of our forces.

To give to the people of the United States the maximum information consistent with the limitations imposed by the first object.

To cause to be presented to the American people the facts as they were known at the time.

There were with our forces 36 regularly accredited correspondents, while visiting correspondents reached a total of 411.

SUMMER OF 1917 TO SPRING OF 1918.

31. In order to hinder the enemy's conquest of Russia and, if possible, prevent a German attack on Italy, or in the near east, the Allies sought to maintain the offensive on the western front as far as their diminished strength and morale would permit. On June 7, 1917, the British took Messines, while a succession of operations known as the Third Battle of Ypres began on July 31 and terminated with the capture of the Passchendaele Ridge November 6-10. The British attack at Cambrai is of special interest, since it was here that American troops (Eleventh Engineers) first participated in active fighting.

The French successfully attacked on a limited front near Verdun, capturing Mort Homme on August 20 and advancing their lines to La Forge Brook. In another offensive, begun on October 23, they gained considerable ground on Chemin des Dames Ridge. These French attacks were characterized by most careful preparation to insure success in order to improve the morale of their troops.

32. Notwithstanding these Allied attacks on the western front, the immense gains by the German armies in the east, culminating at Riga on September 3, precipitated the collapse of Russia. The following month, the Austrians with German assistance surprised the Italians and broke through the lines at Caporetto, driving the Italian armies back to the Piave River, inflicting a loss of 300,000 men, 600,000 rifles, 3,000 guns, and enormous stores. This serious crisis compelled the withdrawal of 10 French and British divisions from the western front to Italy. The German situation on all other theaters was so favorable that as early as November they began the movement of divisions toward the western front. If needed, her

divisions could be withdrawn from the Italian front before the French and British dared recall their divisions.

33. At first the Allies could hardly hope for a large American Army. Marshal Joffre during his visit to America had made special request that a combat division be sent at once to Europe as visual evidence of our purpose to participate actively in the war; and also asked for Engineer regiments and other special service units.

The arrival of the First Division and the parade of certain of its elements in Paris on July 4 caused great enthusiasm and for the time being French morale was stimulated. Still Allied apprehension was deep-seated and material assistance was imperative. The following extract is quoted from the cabled summary of an Allied conference held on July 26 with the French and Italian Commanders-in-Chief and the British and French Chiefs of Staff:

General conclusions reached were necessity for adoption of purely defensive attitude on all secondary fronts and withdrawing surplus troops for duty on western front. By thus strengthening western front believed Allies could hold until American forces arrive in numbers sufficient to gain ascendancy.

The conference urged the immediate study of the tonnage situation with a view to accelerating the arrival of American troops. With the approach of winter, depression among the Allies over the Russian collapse and the Italian crisis was intensified by the conviction that the Germans would undertake a decisive offensive in the spring.

A review of the situation showed that with Russia out of the war the Central Powers would be able to release a large number of divisions for service elsewhere, and that during the spring and summer of 1918, without interfering with the status quo at Salonika, they could concentrate on the western front a force much stronger than that of the Allies. In view of this, it was represented to the War Department in December as of the utmost importance that the Allied preparations be expedited.

34. On December 31, 1917, there were 176,665 American troops in France and but one division had appeared on the front. Disappointment at the delay of the American effort soon began to develop. French and British authorities suggested the more rapid entry of our troops into the line and urged the amalgamation of our troops with their own, even insisting upon the curtailment of training to conform to the strict minimum of trench requirements they considered necessary.

My conclusion was that, although the morale of the German people and of the armies was better than it had been for two years, only an untoward combination of circumstances could give the enemy a decisive victory before American support as recommended could be made effective, provided the Allies secured unity of action. How-

ever, a situation might arise which would necessitate the temporary use of all American troops in the units of our Allies for the defensive, but nothing in the situation justified the relinquishment of our firm purpose to form our own Army under our own flag.

While the Germans were practicing for open warfare and concentrating their most aggressive personnel in shock divisions, the training of the Allies was still limited to trench warfare. As our troops were being trained for open warfare, there was every reason why we could not allow them to be scattered among our Allies, even by divisions, much less as replacements, except by pressure of sheer necessity. Any sort of permanent amalgamation would irrevocably commit America's fortunes to the hands of the Allies. Moreover it was obvious that the lack of homogeneity would render these mixed divisions difficult to maneuver and almost certain to break up under stress of defeat, with the consequent mutual recrimination. Again, there was no doubt that the realization by the German people that independent American divisions, corps, or armies were in the field with determined purpose would be a severe blow to German morale and prestige.

It was also certain that an early appearance of the larger American units on the front would be most beneficial to the morale of the Allies themselves. Accordingly, the First Division, on January 19, 1918, took over a sector north of Toul; the Twenty-sixth Division went to the Soissons front early in February; the Forty-second Division entered the line near Luneville, February 21, and the Second Division near Verdun, March 18. Meanwhile, the First Army Corps Headquarters, Maj. Gen. Hunter Liggett, commanding, was organized at Neufchateau on January 20, and the plan to create an independent American sector on the Lorraine front was taking shape.

This was the situation when the great German offensive was launched on March 21, 1918.

PART II.

OPERATIONS.

EXPEDITING SHIPMENT OF TROOPS.

1. The War Department planned as early as July, 1917, to send to France by June 15, 1918, 21 divisions of the then strength of 20,000 men each, together with auxiliary and replacement troops, and those needed for the line of communications, amounting to over 200,000, making a total of some 650,000 men. Beginning with October, 6 divisions were to be sent during that quarter, 7 during the first quarter of 1918, and 8 the second quarter. While these numbers fell short of my recommendation of July 6, 1917, which contemplated at least 1,000,000 men by May, 1918, it should be borne in mind that the main factor in the problem was the amount of shipping to become available for military purposes, in which must be included tonnage required to supply the Allies with steel, coal, and food.

2. On December 2, 1917, an estimate of the situation was cabled to the War Department with the following recommendation:

Paragraph 3. In view of these conditions, it is of the utmost importance to the Allied cause that we move swiftly. The minimum number of troops we should plan to have in France by the end of June is 4 Army corps of 24 divisions in addition to troops for service of the rear. Have impressed the present urgency upon Gen. Bliss and other American members of the conference. Gens. Robertson, Foch, and Bliss agree with me that this is the minimum that should be aimed at. This figure is given as the lowest we should think of and is placed no higher because the limit of available transportation would not seem to warrant it.

Paragraph 4. A study of transportation facilities shows sufficient American tonnage to bring over this number of troops, but to do so there must be a reduction in the tonnage allotted to other than Army needs. It is estimated that the shipping needed will have to be rapidly increased up to 2,000,000 tons by May, in addition to the amount already allotted. The use of shipping for commercial purposes must be curtailed as much as possible. The Allies are very weak and we must come to their relief this year, 1918. The year after may be too late. It is very doubtful if they can hold on until 1919 unless we give them a lot of support this year. It is therefore strongly recommended that a complete readjustment of transportation be made and that the needs of the War Department as set forth above be regarded as immediate. Further details of these requirements will be sent later.

and again on December 20, 1917:

Understood here that a shipping program based on tonnage in sight prepared in War College Division in September contemplated that entire First Corps with its corps troops and some 32,000 auxiliaries were to have been shipped by end of November, and that an additional program for December, January, and February contemplates that the shipment of the Second Corps with its corps troops and other auxiliaries should be practically completed by the end of February. Should such a program be carried out as per schedule and should shipments continue at corresponding rate, it would not succeed in placing even three complete corps, with proper proportion of Army troops and auxiliaries, in France by the end of May. The actual facts are that shipments are not even keeping up to that schedule. It is now the middle of December and the First Corps is still incomplete by over two entire divisions* and many corps troops. It can not be too emphatically declared that we should be prepared to take the field with at least four corps by June 30. In view of past performances with tonnage heretofore available such a project is impossible of fulfillment, but only by most strenuous attempts to attain such a result will we be in a position to take a proper part in operations in 1918. In view of fact that as the number of our troops here increases a correspondingly greater amount of tonnage must be provided for their supply, and also in view of the slow rate of shipment with tonnage now available, it is of the most urgent importance that more tonnage should be obtained at once as already recommended in my cables and by Gen. Bliss.

3. During January, 1918, discussions were held with the British authorities that resulted in an agreement, which became known as the six-division plan and which provided for the transportation of six entire divisions in British tonnage, without interference with our own shipping program. High commanders, staff, Infantry, and auxiliary troops were to be given experience with British divisions, beginning with battalions, the Artillery to be trained under American direction, using French matériel. It was agreed that when sufficiently trained these battalions were to be re-formed into regiments and that when the Artillery was fully trained all of the units comprising each division were to be united for service under their own officers. It was planned that the period of training with the British should cover about 10 weeks. To supervise the administration and training of these divisions the Second Corps staff was organized February 20, 1918.

In the latter part of January joint note No. 12, presented by the Military Representatives with the Supreme War Council, was approved by the Council. This note concluded that France would be safe during 1918 only under certain conditions, namely:

(a) That the strength of the British and French troops in France are continuously kept up to their present total strength and that they receive the expected reinforcements of not less than two American divisions per month.

* The First, Forty-second, Second, and Twenty-sixth Divisions had arrived; but not the Replacement and the Depot Divisions.

THE GERMAN OFFENSIVES OF 1918 AND RELATED ALLIED AGREEMENTS.

4. The first German offensive of 1918, beginning March 21, overran all resistance during the initial period of the attack. Within eight days the enemy had completely crossed the old Somme battlefield and had swept everything before him to a depth of some 56 kilometers. For a few days the loss of the railroad center of Amiens appeared imminent. The offensive made such inroads upon French and British reserves that defeat stared them in the face unless the new American troops should prove more immediately available than even the most optimistic had dared to hope. On March 27 the Military Representatives with the Supreme War Council prepared their joint note No. 18. This note repeated the previously quoted statement from joint note No. 12, and continued:

The battle which is developing at the present moment in France, and which can extend to the other theaters of operations, may very quickly place the Allied Armies in a serious situation from the point of view of effectives, and the Military Representatives are from this moment of opinion that the above-detailed condition (see (a) par. 3) can no longer be maintained, and they consider as a general proposition that the new situation requires new decisions.

The Military Representatives are of opinion that it is highly desirable that the American Government should assist the Allied Armies as soon as possible by permitting in principle the temporary service of American units in Allied Army corps and divisions. Such reinforcements must, however, be obtained from other units than those American divisions which are now operating with the French, and the units so temporarily employed must eventually be returned to the American Army.

The Military Representatives are of the opinion that from the present time, in execution of the foregoing, and until otherwise directed by the Supreme War Council, only American infantry and machine-gun units, organized as that Government may decide, be brought to France, and that all agreements or conventions hitherto made in conflict with this decision be modified accordingly.

The Secretary of War, who was in France at this time, Gen. Bliss, the American Military Representative with the Supreme War Council, and I at once conferred on the terms of this note, with the result that the Secretary recommended to the President that joint note No. 18 be approved in the following sense:

The purpose of the American Government is to render the fullest cooperation and aid, and therefore the recommendation of the Military Representatives with regard to the preferential transportation of American infantry and machine-gun units in the present emergency is approved. Such units, when transported, will be under the direction of the Commander-in-Chief of the American Expeditionary Forces, and will be assigned for training and use by him in his discretion. He will use these and all other military forces of the United States under his command in such manner as to render the greatest military assistance, keeping in mind always the determination of this Government to have its various military forces collected, as speedily as their training and the military

situation permits, into an independent American Army, acting in concert with the armies of Great Britain and France, and all arrangements made by him for their temporary training and service will be made with that end in view.

While note No. 18 was general in its terms, the priority of shipments of infantry more especially pertained to those divisions that were to be trained in the British area, as that Government was to provide the additional shipping according to the six-division plan agreed upon even before the beginning of the March 21 offensive.

On April 2 the War Department cabled that preferential transportation would be given to American infantry and machine-gun units during the existing emergency. Preliminary arrangements were made for training and early employment with the French of such infantry units as might be sent over by our own transportation. As for the British agreement, the six-division plan was to be modified to give priority to the infantry of those divisions. However, all the Allies were now urging the indefinite continuation of priority for the shipment of infantry and its complete incorporation in their units, which fact was cabled to the War Department on April 3, with the specific recommendation that the total immediate priority of infantry be limited to four divisions, plus 45,500 replacements, and that the necessity for future priority be determined later.

5. The Secretary of War and I held a conference with British authorities on April 7, during which it developed that the British had erroneously assumed that the preferential shipment of infantry was to be continuous. It was agreed at this meeting that 60,000 infantry and machine-gun troops, with certain auxiliary units to be brought over by British tonnage during April, should go to the British area as part of the six-division plan, but that there should be a further agreement as to subsequent troops to be brought over by the British. Consequently, a readjustment of the priority schedule was undertaken on the basis of postponing "shipment of all noncombatant troops to the utmost possible to meet present situation, and at the same time not make it impossible to build up our own Army."

6. The battle line in the vicinity of Amiens had hardly stabilized when, on April 9, the Germans made another successful attack against the British lines on a front of some 40 kilometers in the vicinity of Armentieres and along the Lys River. As a result of its being included in a salient formed by the German advance, Passchendaele Ridge, the capture of which had cost so dearly in 1917, was evacuated by the British on April 17.

The losses had been heavy and the British were unable to replace them entirely. They were, therefore, making extraordinary efforts to increase the shipping available for our troops. On April 21, I went to London to clear up certain questions concerning the rate of

shipment and to reach the further agreement provided for in the April 7 conference. The result of this London agreement was cabled to Washington April 24, as follows:

(a) That only the infantry, machine guns, engineers, and signal troops of American divisions and the headquarters of divisions and brigades be sent over in British and American shipping during May for training and service with the British army in France up to six divisions and that any shipping in excess of that required for these troops be utilized to transport troops necessary to make these divisions complete. The training and service of these troops will be carried out in accordance with plans already agreed upon between Sir Douglas Haig and Gen. Pershing, with a view at an early date of building up American divisions.

(b) That the American personnel of the artillery of these divisions and such corps troops as may be required to build up American corps organizations follow immediately thereafter, and that American artillery personnel be trained with French matériel and join its proper divisions as soon as thoroughly trained.

(c) If, when the program outlined in paragraphs (a) and (b) is completed, the military situation makes advisable the further shipment of infantry, etc., of American divisions, then all the British and American shipping available for transport of troops shall be used for that purpose under such arrangement as will insure immediate aid to the Allies, and at the same time provide at the earliest moment for bringing over American artillery and other necessary units to complete the organization of American divisions and corps. Provided that the combatant troops mentioned in (a) and (b) be followed by such Service of the Rear and other troops as may be considered necessary by the American Commander-in-Chief.

(d) That it is contemplated American divisions and corps when trained and organized shall be utilized under the American Commander-in-Chief in an American group.

(e) That the American Commander-in-Chief shall allot American troops to the French or British for training or train them with American units at his discretion, with the understanding that troops already transported by British shipping or included in the six divisions mentioned in paragraph (a) are to be trained with the British Army, details as to rations, equipment, and transport to be determined by special agreement.

7. At a meeting of the Supreme War Council held at Abbeville May 1 and 2, the entire question of the amalgamation of Americans with the French and British was reopened. An urgent appeal came from both French and Italian representatives for American replacements or units to serve with their armies. After prolonged discussion regarding this question and that of priority generally the following agreement was reached, committing the Council to an independent American Army and providing for the immediate shipment of certain troops:

It is the opinion of the Supreme War Council that, in order to carry the war to a successful conclusion, an American Army should be formed as early as possible under its own commander and under its own flag. In order to meet the present emergency it is agreed that American troops should be brought to France as rapidly as Allied transportation facilities will permit, and that, as far as consistent with the necessity of building up an American Army, prefer-

ence will be given to infantry and machine-gun units for training and service with French and British Armies; with the understanding that such infantry and machine-gun units are to be withdrawn and united with its own artillery and auxiliary troops into divisions and corps at the direction of the American Commander-in-Chief after consultation with the Commander-in-Chief of the Allied Armies in France.

Subparagraph A. It is also agreed that during the month of May preference should be given to the transportation of infantry and machine-gun units of six divisions, and that any excess tonnage shall be devoted to bringing over such other troops as may be determined by the American Commander-in-Chief.

Subparagraph B. It is further agreed that this program shall be continued during the month of June upon condition that the British Government shall furnish transportation for a minimum of 130,000 men in May and 150,000 men in June, with the understanding that the first six divisions of infantry shall go to the British for training and service, and that troops sent over in June shall be allocated for training and service as the American Commander-in-Chief may determine.

Subparagraph C. It is also further agreed that if the British Government shall transport an excess of 150,000 men in June that such excess shall be infantry and machine-gun units, and that early in June there shall be a new review of the situation to determine further action.

The gravity of the situation had brought the Allies to a full realization of the necessity of providing all possible tonnage for the transportation of American troops. Although their views were accepted to the extent of giving a considerable priority to infantry and machine gunners, the priority agreed upon as to this class of troops was not as extensive as some of them deemed necessary, and the Abbeville conference was adjourned with the understanding that the question of further priority would be discussed at a conference to be held about the end of May.

8. The next offensive of the enemy was made between the Oise and Berry-au-Bac against the French instead of against the British, as was generally expected, and it came as a complete surprise. The initial Aisne attack, covering a front of 35 kilometers, met with remarkable success, as the German armies advanced no less than 50 kilometers in four days. On reaching the Marne that river was used as a defensive flank and the German advance was directed toward Paris. During the first days of June something akin to a panic seized the city and it was estimated that 1,000,000 people left during the spring of 1918.

The further conference which had been agreed upon at Abbeville was held at Versailles on June 1 and 2. The opinion of our Allies as to the existing situation and the urgency of their insistence upon further priority for infantry and machine gunners are shown by the following message prepared by the Prime Ministers of Great Britain, France, and Italy, and agreed to by Gen. Foch:

The Prime Ministers of France, Italy, and Great Britain, now meeting at Versailles, desire to send the following message to the President of the United States:

"We desire to express our warmest thanks to President Wilson for the remarkable promptness with which American aid, in excess of what at one time seemed practicable, has been rendered to the Allies during the past month to meet a great emergency. The crisis, however, still continues. Gen. Foch has presented to us a statement of the utmost gravity, which points out that the numerical superiority of the enemy in France, where 162 Allied divisions now oppose 200 German divisions, is very heavy, and that, as there is no possibility of the British and French increasing the number of their divisions (on the contrary, they are put to extreme straits to keep them up) there is a great danger of the war being lost unless the numerical inferiority of the Allies can be remedied as rapidly as possible by the advent of American troops. He, therefore, urges with the utmost insistence that the maximum possible number of infantry and machine gunners, in which respect the shortage of men on the side of the Allies is most marked, should continue to be shipped from America in the months of June and July to avert the immediate danger of an Allied defeat in the present campaign owing to the Allied reserves being exhausted before those of the enemy. In addition to this, and looking to the future, he represents that it is impossible to foresee ultimate victory in the war unless America is able to provide such an Army as will enable the Allies ultimately to establish numerical superiority. He places the total American force required for this at no less than 100 divisions, and urges the continuous raising of fresh American levies, which, in his opinion, should not be less than 300,000 a month, with a view to establishing a total American force of 100 divisions at as early a date as this can possibly be done.

"We are satisfied that Gen. Foch, who is conducting the present campaign with consummate ability, and on whose military judgment we continue to place the most absolute reliance, is not overestimating the needs of the case, and we feel confident that the Government of the United States will do everything that can be done, both to meet the needs of the immediate situation and to proceed with the continuous raising of fresh levies, calculated to provide, as soon as possible, the numerical superiority which the Commander-in-Chief of the Allied Armies regards as essential to ultimate victory."

A separate telegram contains the arrangements which Gen. Foch, Gen. Pershing, and Lord Milner have agreed to recommend to the United States Government with regard to the dispatch of American troops for the months of June and July.

(Signed)

CLEMENCEAU,
D. LLOYD GEORGE,
ORLANDO.

Such extensive priority had already been given to the transport of American infantry and machine gunners that the troops of those categories which had received even partial training in the United States were practically exhausted. Moreover, the strain on our Services of Supply made it essential that early relief be afforded by increasing its personnel. At the same time, the corresponding services of our Allies had in certain departments been equally overtaxed and their responsible heads were urgent in their representations that their needs must be relieved by bringing over American specialists. The final agreement was cabled to the War Department on June 5, as follows:

The following agreement has been concluded between Gen. Foch, Lord Milner, and myself with reference to the transportation of American troops in the months of June and July:

"The following recommendations are made on the assumption that at least 250,000 men can be transported in each of the months of June and July by the employment of combined British and American tonnage. We recommend:

"(a) For the month of June: (1) Absolute priority shall be given to the transportation of 170,000 combatant troops (viz, six divisions without artillery, ammunition trains, or supply trains, amounting to 126,000 men and 44,000 replacements for combat troops); (2) 25,400 men for the service of the railways, of which 13,400 have been asked for by the French Minister of Transportation, (3) the balance to be troops of categories to be determined by the Commander-in-Chief, American Expeditionary Forces.

"(b) For the month of July: (1) Absolute priority for the shipment of 140,000 combatant troops of the nature defined above (four divisions minus artillery "et cetera" amounting to 84,000 men, plus 56,000 replacement); (2) the balance of the 250,000 to consist of troops to be designated by the Commander-in-Chief, American Expeditionary Forces.

"(c) It is agreed that if the available tonnage in either month allows of the transportation of a larger number of men than 250,000, the excess tonnage will be employed in the transportation of combat troops as defined above.

"(d) We recognize that the combatant troops to be dispatched in July may have to include troops which have had insufficient training, but we consider the present emergency is such as to justify a temporary and exceptional departure by the United States from sound principles of training, especially as a similar course is being followed by France and Great Britain.

(Signed)

"FOCH.

"MILNER.

"PERSHING."

9. The various proposals during these conferences regarding priority of shipment, often very insistent, raised questions that were not only most difficult but most delicate. On the one hand, there was a critical situation which must be met by immediate action, while, on the other hand, any priority accorded a particular arm necessarily postponed the formation of a distinctive American fighting force and the means to supply it. Such a force was, in my opinion, absolutely necessary to win the war. A few of the Allied representatives became convinced that the American Services of Supply should not be neglected but should be developed in the common interest. The success of our divisions during May and June demonstrated fully that it was not necessary to draft Americans under foreign flags in order to utilize American manhood most effectively.

ALLIED COMMANDER-IN-CHIEF.

10. When, on March 21, 1918, the German Army on the western front began its series of offensives, it was by far the most formidable force the world had ever seen. In fighting men and guns it had a great superiority, but this was of less importance than the advantage in morale, in experience, in training for mobile warfare, and in

unity of command. Ever since the collapse of the Russian armies and the crisis on the Italian front in the fall of 1917, German armies were being assembled and trained for the great campaign which was to end the war before America's effort could be brought to bear. Germany's best troops, her most successful generals, and all the experience gained in three years of war were mobilized for the supreme effort.

The first blow fell on the right of the British Armies, including the junction of the British and French forces. Only the prompt cooperation of the French and British general headquarters stemmed the tide. The reason for this objective was obvious and strikingly illustrated the necessity for having some one with sufficient authority over all the Allied Armies to meet such an emergency. The lack of complete cooperation among the Allies on the western front had been appreciated and the question of preparation to meet a crisis had already received attention by the Supreme War Council. A plan had been adopted by which each of the Allies would furnish a certain number of divisions for a general reserve to be under the direction of the military representatives of the Supreme War Council of which Gen. Foch was then the senior member. But when the time came to meet the German offensive in March these reserves were not found available and the plan failed.

This situation resulted in a conference for the immediate consideration of the question of having an Allied Commander-in-Chief. After much discussion during which my view favoring such action was clearly stated, an agreement was reached and Gen. Foch was selected. His appointment as such was made April 3 and was approved for the United States by the President on April 16. The terms of the agreement under which Gen. Foch exercised his authority were as follows:

BEAUVAIS, *April 3, 1918.*

Gen. Foch is charged by the British, French, and American Governments with the coordination of the action of the Allied Armies on the western front; to this end there is conferred on him all the powers necessary for its effective realization. To the same end, the British, French, and American Governments confide in Gen. Foch the strategic direction of military operations.

The Commander-in-Chief of the British, French, and American Armies will exercise to the fullest extent the tactical direction of their armies. Each Commander-in-Chief will have the right to appeal to his Government, if in his opinion his Army is placed in danger by the instructions received from Gen. Foch.

(Signed)

G. CLEMENCEAU.

PETAIN.

F. FOCH.

LLOYD GEORGE.

D. HAIG, *F. M.*

HENRY WILSON, *General, 3.4.18.*

TASKER H. BLISS, *General and Chief of Staff.*

JOHN J. PERSHING, *General, U. S. A.*

EMPLOYMENT OF AMERICAN DIVISIONS FROM MARCH TO SEPTEMBER, 1918.

11. The grave crisis precipitated by the first German offensive caused me to make a hurried visit to Gen. Foch's headquarters, at Bombon, during which all our combatant forces were placed at his disposal. The acceptance of this offer meant the dispersion of our troops along the Allied front and a consequent delay in building up a distinctive American force in Lorraine, but the serious situation of the Allies demanded this divergence from our plans.

On March 21, approximately 300,000 American troops had reached France. Four combat divisions, equivalent in strength to eight French or British divisions, were available—the First and Second then in line, and the Twenty-sixth and Forty-second just withdrawn from line after one month's trench warfare training. The last two divisions at once began taking over quiet sectors to release divisions for the battle; the Twenty-sixth relieved the First Division, which was sent to northwest of Paris in reserve; the Forty-second relieved two French divisions from quiet sectors. In addition to these troops, one regiment of the Ninety-third Division was with the French in the Argonne, the Forty-first Depot Division was in the Services of Supply, and three divisions (Third, Thirty-second, and Fifth) were arriving.

12. On April 25 the First Division relieved two French divisions on the front near Montdidier and on May 28 captured the important observation stations on the heights of Cantigny with splendid dash. French artillery, aviation, tanks, and flame throwers aided in the attack, but most of this French assistance was withdrawn before the completion of the operation in order to meet the enemy's new offensive launched May 27 toward Chateau-Thierry. The enemy reaction against our troops at Cantigny was extremely violent, and apparently he was determined at all costs to counteract the most excellent effect the American success had produced. For three days his guns of all calibers were concentrated on our new position and counterattack succeeded counterattack. The desperate efforts of the Germans gave the fighting at Cantigny a seeming tactical importance entirely out of proportion to the numbers involved.

13. Of the three divisions arriving in France when the first German offensive began, the Thirty-second, intended for replacements, had been temporarily employed in the Services of Supply to meet a shortage of personnel, but the critical situation caused it to be re-assembled and by May 21 it was entering the line in the Vosges. At this time the Fifth Division, though still incomplete, was also ordered into the line in the same region. The Third Division was

assembling in its training area and the Third Corps staff had just been organized to administer these three divisions. In addition to the eight divisions already mentioned, the Twenty-eighth and Seventy-seventh had arrived in the British area, and the Fourth, Twenty-seventh, Thirtieth, Thirty-third, Thirty-fifth, and Eighty-second were arriving there. Following the agreements as to British shipping, our troops came so rapidly that by the end of May we had a force of 600,000 in France.

The third German offensive on May 27, against the French on the Aisne, soon developed a desperate situation for the Allies. The Second Division, then in reserve northwest of Paris and preparing to relieve the First Division, was hastily diverted to the vicinity of Meaux on May 31, and, early on the morning of June 1, was deployed across the Chateau-Thierry-Paris road near Montreuil-aux-Lions in a gap in the French line, where it stopped the German advance on Paris. At the same time the partially trained Third Division was placed at French disposal to hold the crossings of the Marne, and its motorized machine-gun battalion succeeded in reaching Chateau-Thierry in time to assist in successfully defending that river crossing.

The enemy having been halted, the Second Division commenced a series of vigorous attacks on June 4, which resulted in the capture of Belleau Woods after very severe fighting. The village of Bouresches was taken soon after, and on July 1 Vaux was captured. In these operations the Second Division met with most desperate resistance by Germany's best troops.

14. To meet the March offensive, the French had extended their front from the Oise to Amiens, about 60 kilometers, and during the German drive along the Lys had also sent reinforcements to assist the British. The French lines had been further lengthened about 45 kilometers as a result of the Marne pocket made by the Aisne offensive. This increased frontage and the heavy fighting had reduced French reserves to an extremely low point.

Our Second Corps, under Maj. Gen. George W. Read, had been organized for the command of the 10 divisions with the British, which were held back in training areas or assigned to second-line defenses. After consultation with Field Marshal Haig on June 3, 5 American divisions were relieved from the British area to support the French. The Seventy-seventh and Eighty-second Divisions were moved south to release the Forty-second and Twenty-sixth for employment on a more active portion of the front; the Thirty-fifth Division entered the line in the Vosges, and the Fourth and Twenty-eighth Divisions were moved to the region of Meaux and Chateau-Thierry as reserves.

On June 9 the Germans attacked the Montdidier-Noyon front in an effort to widen the Marne pocket and bring their lines nearer to Paris, but were stubbornly held by the French with comparatively little loss of ground. In view of the unexpected results of the three preceding attacks by the enemy, this successful defense proved beneficial to the Allied morale, particularly as it was believed that the German losses were unusually heavy.

15. On July 15, the date of the last German offensive, the First, Second, Third, and Twenty-sixth Divisions were on the Chateau-Thierry front with the Fourth and Twenty-eighth in support, some small units of the last two divisions gaining front-line experience with our troops or with the French; the Forty-second Division was in support of the French east of Rheims; and four colored regiments were with the French in the Argonne. On the Alsace-Lorraine front we had five divisions in line with the French. Five were with the British Army, three having elements in the line. In our training areas four divisions were assembled and four were in the process of arrival.

The Marne salient was inherently weak and offered an opportunity for a counteroffensive that was obvious. If successful, such an operation would afford immediate relief to the Allied defense, would remove the threat against Paris, and free the Paris-Nancy Railroad. But, more important than all else, it would restore the morale of the Allies and remove the profound depression and fear then existing. Up to this time our units had been put in here and there at critical points as emergency troops to stop the terrific German advance. In every trial, whether on the defensive or offensive, they had proved themselves equal to any troops in Europe. As early as June 23 and again on July 10 at Bombon, I had very strongly urged that our best divisions be concentrated under American command, if possible, for use as a striking force against the Marne salient. Although the prevailing view among the Allies was that American units were suitable only for the defensive, and that at all events they could be used to better advantage under Allied command, the suggestion was accepted in principle, and my estimate of their offensive fighting qualities was soon put to the test.

The enemy had encouraged his soldiers to believe that the July 15 attack would conclude the war with a German peace. Although he made elaborate plans for the operation, he failed to conceal fully his intentions, and the front of attack was suspected at least one week ahead. On the Champagne front the actual hour for the assault was known and the enemy was checked with heavy losses. The Forty-second Division entered the line near Somme Py immediately, and five of its infantry battalions and all its artillery became engaged. Southwest of Rheims and along the Marne to the east of Chateau-

Thierry the Germans were at first somewhat successful, a penetration of 8 kilometers beyond the river being effected against the French immediately to the right of our Third Division. The following quotation from the report of the commanding general Third Division gives the result of the fighting on his front:

Although the rush of the German troops overwhelmed some of the front-line positions, causing the infantry and machine-gun companies to suffer, in some cases a 50 per cent loss, no German soldier crossed the road from Fossoy to Crezancy, except as a prisoner of war, and by noon of the following day (July 16) there were no Germans in the foreground of the Third Division sector except the dead.

On this occasion a single regiment of the Third Division wrote one of the most brilliant pages in our military annals. It prevented the crossing at certain points on its front, while on either flank the Germans who had gained a footing pressed forward. Our men, firing in three directions, met the German attacks with counterattacks at critical points and succeeded in throwing two German divisions into complete confusion, capturing 600 prisoners.

16. The selection by the Germans of the Champagne sector and the eastern and southern faces of the Marne pocket on which to make their offensive was fortunate for the Allies, as it favored the launching of the counterattack already planned. There were now over 1,200,000 American troops in France, which provided a considerable force of reserves. Every American division with any sort of training was made available for use in a counteroffensive.

Gen. Petain's initial plan for the counterattack involved the entire western face of the Marne salient. The First and Second American Divisions, with the First French Moroccan Division between them, were employed as the spearhead of the main attack, driving directly eastward, through the most sensitive portion of the German lines, to the heights south of Soissons. The advance began on July 18, without the usual brief warning of a preliminary bombardment, and these three divisions at a single bound broke through the enemy's infantry defenses and overran his artillery, cutting or interrupting the German communications leading into the salient.¹ A general withdrawal from the Marne was immediately begun by the enemy, who still fought stubbornly to prevent disaster.

The First Division, throughout 4 days of constant fighting, advanced 11 kilometers, capturing Berzy-le-Sec and the heights above Soissons and taking some 3,500 prisoners and 68 field guns from the 7 German divisions employed against it. It was relieved by a British division. The Second Division advanced 8 kilometers in the first 26 hours, and by the end of the second day

¹ See plate No. 1.

was facing Tigny, having captured 3,000 prisoners and 66 field guns. It was relieved the night of the 19th by a French division. The result of this counteroffensive was of decisive importance. Due to the magnificent dash and power displayed on the field of Soissons by our First and Second Divisions the tide of war was definitely turned in favor of the Allies.

Other American divisions participated in the Marne counteroffensive. A little to the south of the Second Division, the Fourth was in line with the French and was engaged until July 22. The First American Corps, Maj. Gen. Hunter Liggett commanding, with the Twenty-sixth Division and a French division, acted as a pivot of the movement toward Soissons, capturing Torcy on the 18th and reaching the Chateau-Thierry-Soissons road on the 21st. At the same time the Third Division crossed the Marne and took the heights of Mont St. Pere and the villages of Charteves and Jaulgonne.

In the First Corps, the Forty-second Division relieved the Twenty-sixth on July 25 and extended its front, on the 26th relieving the French division. From this time until August 2 it fought its way through the Forest de Fere and across the Ourcq, advancing toward the Vesle until relieved by the Fourth Division on August 3. Early in this period elements of the Twenty-eighth Division participated in the advance.

Farther to the east the Third Division forced the enemy back to Roncheres Wood, where it was relieved on July 30 by the Thirty-second Division from the Vosges front. The Thirty-second, after relieving the Third and some elements of the Twenty-eighth on the line of the Ourcq River, advanced abreast of the Forty-second toward the Vesle. On August 3 it passed under control of our Third Corps, Maj. Gen. Robert L. Bullard commanding, which made its first appearance in battle at this time, while the Fourth Division took up the task of the Forty-second Division and advanced with the Thirty-second to the Vesle River, where, on August 6, the operation for the reduction of the Marne salient terminated.

In the hard fighting from July 18 to August 6 the Germans were not only halted in their advance but were driven back from the Marne to the Vesle and committed wholly to the defensive. The force of American arms had been brought to bear in time to enable the last offensive of the enemy to be crushed.

17. The First and Third Corps now held a continuous front of 11 kilometers along the Vesle. On August 12 the Seventy-seventh Division relieved the Fourth Division on the First Corps front, and the following day the Twenty-eighth relieved the Thirty-second Division in the Third Corps, while from August 6 to August 10 the Sixth

Infantry Brigade of the Third Division held a sector on the river line. The transfer of the First Corps to the Woevre was ordered at this time, and the control of its front was turned over to the Third Corps.

On August 18 Gen. Petain began an offensive between Rheims and the Oise. Our Third Corps participated in this operation, crossing the Vesle on September 4 with the Twenty-eighth and Seventy-seventh Divisions and overcoming stubborn opposition on the plateau south of the Aisne, which was reached by the Seventy-seventh on September 6. The Twenty-eighth was withdrawn from the line on September 7. Two days later the Third Corps was transferred to the region of Verdun, the Seventy-seventh Division remaining in line on the Aisne River until September 17.

The Thirty-second division, upon its relief from the battle on the Vesle, joined a French corps north of Soissons and attacked from August 29 to 31, capturing Juvigny after some particularly desperate fighting and reaching the Chauny-Soissons road.

18. On the British front two regiments of the Thirty-third Division participated in an attack on Hamel July 4, and again on August 9 as an incident of the allied offensive against the Amiens salient. One of these regiments took Gressaire Wood and Chipilly Ridge, capturing 700 prisoners and considerable matériel.

ASSEMBLING THE FIRST AMERICAN ARMY.

19. In conference with Gen. Petain at Chantilly on May 19 it had been agreed that the American Army would soon take complete charge of the sector of the Woevre. The Twenty-sixth Division was already in line in the Woevre north of Toul and was to be followed by other American divisions as they became available, with the understanding that the sector was to pass to our control when four divisions were in the line. But demands of the battle then going on farther west required the presence of our troops, and the agreement had no immediate result. Due to the presence of a number of our divisions northeast of Paris, the organization of an American corps sector in the Chateau-Thierry region was taken up with Gen. Petain, and on July 4 the First Corps assumed tactical control of a sector in that region. This was an important step, but it was by no means satisfactory, as only one American division at the moment was operating under the control of the First Corps, while we had at this time eight American divisions in the front line serving in French corps.

20. The counter-offensives against the Marne salient in July, and against the Amiens salient in August had gained such an advantage that it was apparent that the emergency, which justified the dis-

persion of our divisions, had passed. The moment was propitious for assembling our divisions. Scattered as they were along the Allied front, their supply had become very difficult. From every point of view the immediate organization of an independent American force was indicated. The formation of the Army in the Chateau-Thierry region and its early transfer to the sector of the Woevre, which was to extend from Nomeny, east of the Moselle, to north of St. Mihiel, was therefore decided upon by Marshal Foch and myself on August 9, and the details were arranged with Gen. Petain later on the same day.

ST. MIHIEL OPERATION.

21. At Bombon on July 24 there was a conference of all the Commanders-in-Chief for the purpose of considering Allied operations. Each presented proposals for the employment of the armies under his command and these formed the basis of future cooperation of the Allies. It was emphatically determined that the Allied attitude should be to maintain the offensive. As the first operation of the American Army, the reduction of the salient of St. Mihiel was to be undertaken as soon as the necessary troops and material could be made available. On account of the swampy nature of the country it was especially important that the movement be undertaken and finished before the fall rains should begin, which was usually about the middle of September.

Arrangements were concluded for successive relief of American divisions and the organization of the First American Army under my personal command was announced on August 10, with La Ferté-sous-Jouarre as headquarters. This Army nominally assumed control of a portion of the Vesle front, although at the same time directions were given for its secret concentration in the St. Mihiel sector.

22. The force of American soldiers in France at that moment was sufficient to carry out this offensive, but they were dispersed along the front from Switzerland to the Channel. The three Army Corps headquarters to participate in the St. Mihiel attack were the First, Fourth, and Fifth. The First was on the Vesle, the Fourth at Toul, and the Fifth not yet completely organized. To assemble combat divisions and service troops and undertake a major operation, within the short period available and with staffs so recently organized, was an extremely difficult task. Our deficiencies in Artillery, Aviation, and special troops, caused by the shipment of an undue proportion of Infantry and Machine Guns during the summer, were largely met by the French.

23. The reduction of the St. Mihiel salient was important, as it would prevent the enemy from interrupting traffic on the Paris-Nancy Railroad by artillery fire and would free the railroad leading north through St. Mihiel to Verdun. It would also provide us with an advantageous base of departure for an attack against the Metz-Sedan Railroad system which was vital to the German armies west of Verdun, and against the Briey Iron Basin which was necessary for the production of German armament and munitions.

The general plan was to make simultaneous attacks against the flanks of the salient. The ultimate objective was tentatively fixed as the general line Marieulles (east of the Moselle)—heights south of Gorze-Mars la Tour-Etain. The operation contemplated the use on the western face of 3 or 4 American divisions, supported by the attack of 6 divisions of the Second French Army on their left, while 7 American divisions would attack on the southern face, and 3 French divisions would press the enemy at the tip of the salient. As the part to be taken by the Second French Army would be closely related to the attack of the First American Army, Gen. Petain placed all the French troops involved under my personal command.

By August 30, the concentration of the scattered divisions, corps, and army troops, of the quantities of supplies and munitions required, and the necessary construction of light railways and roads, were well under way.

24. In accordance with the previous general consideration of operations at Bombon on July 24, an allied offensive extending practically along the entire active front was eventually to be carried out. After the reduction of the St. Mihiel sector the Americans were to cooperate in the concerted effort of the Allied armies. It was the sense of the conference of July 24, that the extent to which the different operations already planned might carry us could not be then foreseen, especially if the results expected were achieved before the season was far advanced. It seemed reasonable at that time to look forward to a combined offensive for the autumn, which would give no respite to the enemy and would increase our advantage for the inauguration of succeeding operations extending into 1919.

On August 30, a further discussion with Marshal Foch was held at my headquarters at Ligny-en-Barrois. In view of the new successes of the French and British near Amiens and the continued favorable results toward the Chemin des Dames on the French front, it was now believed that the limited allied offensive, which was to prepare for the campaign of 1919, might be carried further before the end of the year. At this meeting it was proposed by Marshal

Foch that the general operations as far as the American Army was concerned should be carried out in detail by:

(a) An attack between the Meuse and the Argonne by the Second French Army, reinforced by from four to six American divisions.

(b) A French-American attack, extending from the Argonne west to the Souain Road, to be executed on the right by an American Army astride the Aisne and on the left by the Fourth French Army.

To carry out these attacks the 10 to 11 American divisions suggested for the St. Mihiel operation and the 4 to 6 for the Second French Army, would leave 8 to 10 divisions for an American Army on the Aisne. It was proposed that the St. Mihiel operation should be initiated on September 10 and the other two on September 15 and 20, respectively.

25. The plan suggested for the American participation in these operations was not acceptable to me because it would require the immediate separation of the recently formed First American Army into several groups, mainly to assist French armies. This was directly contrary to the principle of forming a distinct American Army, for which my contention had been insistent. An enormous amount of preparation had already been made in construction of roads, railroads, regulating stations, and other installations looking to the use and supply of our armies on a particular front. The inherent disinclination of our troops to serve under allied commanders would have grown and American morale would have suffered. My position was stated quite clearly that the strategical employment of the First Army as a unit would be undertaken where desired, but its disruption to carry out these proposals would not be entertained.

A further conference at Marshal Foch's headquarters was held on September 2, at which Gen. Petain was present. After discussion the question of employing the American Army as a unit was conceded. The essentials of the strategical decision previously arrived at provided that the advantageous situation of the Allies should be exploited to the utmost by vigorously continuing the general battle and extending it eastward to the Meuse. All the Allied armies were to be employed in a converging action. The British armies, supported by the left of the French armies, were to pursue the attack in the direction of Cambrai; the center of the French armies, west of Rheims, would continue the actions, already begun, to drive the enemy beyond the Aisne; and the American Army, supported by the right of the French armies, would direct its attack on Sedan and Mezieres.

It should be recorded that although this general offensive was fully outlined at the conference no one present expressed the opinion that the final victory could be won in 1918. In fact, it was believed by the French high command that the Meuse-Argonne attack could not

be pushed much beyond Montfaucon before the arrival of winter would force a cessation of operations.

26. The choice between the two sectors, that east of the Aisne including the Argonne Forest, or the Champagne sector, was left to me. In my opinion, no other Allied troops had the morale or the offensive spirit to overcome successfully the difficulties to be met in the Meuse-Argonne sector and our plans and installations had been prepared for an expansion of operations in that direction. So the Meuse-Argonne front was chosen. The entire sector of 150 kilometers of front, extending from Port-sur-Seille, east of the Moselle, west to include the Argonne Forest, was accordingly placed under my command, including all French divisions then in that zone. The First American Army was to proceed with the St. Mihiel operation, after which the operation between the Meuse and the western edge of the Argonne Forest was to be prepared and launched not later than September 25.

As a result of these decisions, the depth of the St. Mihiel operation was limited to the line Vigneulles - Thiaucourt - Regnieville. The number of divisions to be used was reduced and the time shortened. 18 to 19 divisions were to be in the front line. There were 4 French and 15 American divisions available, 6 of which would be in reserve, while the two flank divisions of the front line were not to advance. Furthermore, 2 Army Corps headquarters, with their corps troops, practically all the Army Artillery and Aviation, and the First, Second, and Fourth Divisions, the first two destined to take a leading part in the St. Mihiel attack, were all due to be withdrawn and started for the Meuse-Argonne by the fourth day of the battle.

27. The salient had been held by the Germans since September, 1914. It covered the most sensitive section of the enemy's position on the Western Front; namely, the Mezieres-Sedan-Metz Railroad and the Briey Iron Basin; it threatened the entire region between Verdun and Nancy, and interrupted the main rail line from Paris to the east. Its primary strength lay in the natural defensive features of the terrain itself. The western face of the salient extended along the rugged, heavily wooded eastern heights of the Meuse; the southern face followed the heights of the Meuse for 8 kilometers to the east and then crossed the plain of the Woevre, including within the German lines the detached heights of Loupmont and Montsec which dominated the plain and afforded the enemy unusual facilities for observation. The enemy had reinforced the positions by every artificial means during a period of four years.

28. On the night of September 11, the troops of the First Army were deployed in position. On the southern face of the salient was the First Corps, Maj. Gen. Liggett, commanding, with the Eighty-

second, Ninetieth, Fifth, and Second Divisions in line, extending from the Moselle westward. On its left was the Fourth Corps, Maj. Gen. Joseph T. Dickman, commanding, with the Eighty-ninth, Forty-second, and First Divisions, the left of this corps being opposite Montsec. These two Army Corps were to deliver the principal attack, the line pivoting on the center division of the First Corps. The First Division on the left of the Fourth Corps was charged with the double mission of covering its own flank while advancing some 20 kilometers due north toward the heart of the salient, where it was to make contact with the troops of the Fifth Corps. On the western face of the salient lay the Fifth Corps, Maj. Gen. George H. Cameron, commanding, with the Twenty-sixth Division, Fifteenth French Colonial Division, and the Fourth Division in line, from Mouilly west to Les Eparges and north to Watronville. Of these three divisions, the Twenty-sixth alone was to make a deep advance directed southeast toward Vigneulles. The French Division was to make a short progression to the edge of the heights in order to cover the left of the Twenty-sixth. The Fourth Division was not to advance. In the center, between our Fourth and Fifth Army Corps, was the Second French Colonial Corps, Maj. Gen. E. J. Blondlat, commanding, covering a front of 40 kilometers with 3 small French divisions. These troops were to follow up the retirement of the enemy from the tip of the salient.

The French independent air force was at my disposal which, together with the British bombing squadrons and our own air forces, gave us the largest assembly of aviation that had ever been engaged in one operation. Our heavy guns were able to reach Metz and to interfere seriously with German rail movements.

At dawn on September 12, after four hours of violent artillery fire of preparation, and accompanied by small tanks, the Infantry of the First and Fourth Corps advanced. The infantry of the Fifth Corps commenced its advance at 8 a. m. The operation was carried out with entire precision. Just after daylight on September 13, elements of the First and Twenty-sixth Divisions made a junction near Hattonchatel and Vigneulles, 18 kilometers northeast of St. Mihiel. The rapidity with which our divisions advanced overwhelmed the enemy, and all objectives were reached by the afternoon of September 13. The enemy had apparently started to withdraw some of his troops from the tip of the salient on the eve of our attack, but had been unable to carry it through. We captured nearly 16,000 prisoners, 443 guns, and large stores of material and supplies. The energy and swiftness with which the operation was carried out enabled us to smother opposition to such an extent that we suffered less than 7,000 casualties during the actual period of the advance.

During the next two days the right of our line west of the Moselle River was advanced beyond the objectives laid down in the original orders. This completed the operation for the time being and the line was stabilized to be held by the smallest practicable force.

29. The material results of the victory achieved were very important. An American Army was an accomplished fact, and the enemy had felt its power. No form of propaganda could overcome the depressing effect on the morale of the enemy of this demonstration of our ability to organize a large American force and drive it successfully through his defenses. It gave our troops implicit confidence in their superiority and raised their morale to the highest pitch. For the first time wire entanglements ceased to be regarded as impassable barriers and open-warfare training, which had been so urgently insisted upon, proved to be the correct doctrine. Our divisions concluded the attack with such small losses and in such high spirits that without the usual rest they were immediately available for employment in heavy fighting in a new theater of operations. The strength of the First Army in this battle totaled approximately 500,000 men, of whom about 70,000 were French.

MEUSE-ARGONNE OPERATION.

30. The definite decision for the Meuse-Argonne phase of the great allied convergent attack was agreed to in my conference with Marshal Foch and Gen. Petain on September 2. It was planned to use all available forces of the First Army, including such divisions and troops as we might be able to withdraw from the St. Mihiel front. The Army was to break through the enemy's successive fortified zones to include the Kriemhilde-Stellung, or Hindenburg Line, on the front Brioules-Romagne sous Montfaucon-Grandpre, and thereafter, by developing pressure toward Mezieres, was to insure the fall of the Hindenburg Line along the Aisne River in front of the Fourth French Army, which was to attack to the west of the Argonne Forest. A penetration of some 12 to 15 kilometers was required to reach the Hindenburg Line on our front, and the enemy's defenses were virtually continuous throughout that depth.

The Meuse-Argonne front had been practically stabilized in September, 1914, and, except for minor fluctuations during the German attacks on Verdun in 1916 and the French counteroffensive in August, 1917, remained unchanged until the American advance in 1918. The net result of the four years' struggle on this ground was a German defensive system of unusual depth and strength and a wide zone of utter devastation, itself a serious obstacle to offensive operations.

31. The strategical importance of this portion of the line was second to none on the western front. All supplies and evacuations of the German armies in northern France were dependent upon two great railway systems—one in the north, passing through Liege, while the other in the south, with lines coming from Luxemburg, Thionville, and Metz, had as its vital section the line Carignan-Sedan-Mezieres. No other important lines were available to the enemy, as the mountainous masses of the Ardennes made the construction of east and west lines through that region impracticable. The Carignan-Sedan-Mezieres line was essential to the Germans for the rapid strategical movement of troops. Should this southern system be cut by the Allies before the enemy could withdraw his forces through the narrow neck between Mezieres and the Dutch frontier, the ruin of his armies in France and Belgium would be complete.

From the Meuse-Argonne front the perpendicular distance to the Carignan-Mezieres railroad was 50 kilometers. This region formed the pivot of German operations in northern France, and the vital necessity of covering the great railroad line into Sedan resulted in the convergence on the Meuse-Argonne front of the successive German defensive positions. The effect of this convergence can be best understood by reference to plate No. 3. It will be seen, for example, that the distance between "no man's land" and the third German withdrawal position in the vicinity of the Meuse River was approximately 18 kilometers; the distance between the corresponding points near the tip of the great salient of the western front was about 65 kilometers, and in the vicinity of Cambrai was over 30 kilometers. The effect of a penetration of 18 kilometers by the American Army would be equivalent to an advance of 65 kilometers farther west; furthermore, such an advance on our front was far more dangerous to the enemy than an advance elsewhere. The vital importance of this portion of his position was fully appreciated by the enemy, who had suffered tremendous losses in 1916 in attempting to improve it by the reduction of Verdun. As a consequence it had been elaborately fortified, and consisted of practically a continuous series of positions 20 kilometers or more in depth.

In addition to the artificial defenses, the enemy was greatly aided by the natural features of the terrain. East of the Meuse the dominating heights not only protected his left but gave him positions from which powerful artillery could deliver an oblique fire on the western bank. Batteries located in the elaborately fortified Argonne forest covered his right flank, and could cross their fire with that of the guns on the east bank of the Meuse. Midway between the Meuse and the forest the heights of Montfaucon offered perfect observation and formed a strong natural position which had been heavily fortified. The east and west ridges abutting on the Meuse and Aire

River valleys afforded the enemy excellent machine-gun positions for the desperate defense which the importance of the position would require him to make. North of Montfaucon densely wooded and rugged heights constituted natural features favorable to defensive fighting.

32. When the First Army became engaged in the simultaneous preparation for two major operations, an interval of 14 days separated the initiation of the two attacks. During this short period the movement of the immense number of troops and the amount of supplies involved in the Meuse-Argonne battle, over the few roads available, and confined entirely to the hours of darkness, was one of the most delicate and difficult problems of the war. The concentration included 15 divisions, of which 7 were involved in the pending St. Mihiel drive, 3 were in sector in the Vosges, 3 in the neighborhood of Soissons, 1 in a training area, and 1 near Bar-le-Duc. Practically all the Artillery, Aviation, and other auxiliaries to be employed in the new operations were committed to the St. Mihiel attack and therefore could not be moved until its success was assured. The concentration of all units not to be used at St. Mihiel was commenced immediately, and on September 13, the second day of St. Mihiel, reserve divisions and Army Artillery units were withdrawn and placed in motion toward the Argonne front.

That part of the American sector from Fresnes-en-Woevre, southeast of Verdun, to the western edge of the Argonne Forest, while nominally under my control, did not actively become a part of my command until September 22, on which date my headquarters were established at Souilly, southwest of Verdun. Of French troops, in addition to the Second French Colonial Corps, composed of 3 divisions, there was also the Seventeenth French Corps of 3 divisions holding the front north and east of Verdun.

33. At the moment of the opening of the Meuse-Argonne battle, the enemy had 10 divisions in line and 10 in reserve on the front between Fresnes-en-Woevre and the Argonne Forest, inclusive. He had undoubtedly expected a continuation of our advance toward Metz. Successful ruses were carried out between the Meuse River and Luneville to deceive him as to our intentions, and French troops were maintained as a screen along our front until the night before the battle, so that the actual attack was a tactical surprise.

34. The operations in the Meuse-Argonne battle really form a continuous whole, but they extended over such a long period of continuous fighting that they will here be considered in three phases, the first from September 26 to October 3, the second from October 4 to 31, and the third from November 1 to 11.

MEUSE-ARGONNE, FIRST PHASE.

35. On the night of September 25, the 9 divisions to lead in the attack were deployed between the Meuse River and the western edge of the Argonne Forest. On the right was the Third Corps, Maj. Gen. Bullard commanding, with the Thirty-third, Eightieth, and Fourth Divisions in line; next came the Fifth Corps, Maj. Gen. Cameron commanding, with the Seventy-Ninth, Thirty-seventh, and Ninety-first Divisions; on the left was the First Corps, Maj. Gen. Liggett commanding, with the Thirty-fifth, Twenty-eighth, and Seventy-seventh Divisions. Each corps had 1 division in reserve and the Army held 3 divisions as a general reserve. About 2,700 guns, 189 small tanks, 142 manned by Americans, and 821 airplanes, 604 manned by Americans, were concentrated to support the attack of the infantry. We thus had a superiority in guns and aviation, and the enemy had no tanks.

The axis of the attack was the line Montfaucon-Romagne-Buzancy, the purpose being to make the deepest penetration in the center, which, with the Fourth French Army advancing west of the Argonne, would force the enemy to evacuate that forest without our having to deliver a heavy attack in that difficult region.

36. Following three hours of violent artillery fire of preparation, the Infantry advanced at 5.30 a. m. on September 26, accompanied by tanks. During the first two days of the attack, before the enemy was able to bring up his reserves, our troops made steady progress through the network of defenses. Montfaucon was held tenaciously by the enemy and was not captured until noon of the second day.

By the evening of the 28th a maximum advance of 11 kilometers had been achieved and we had captured Baulny, Epinonville, Septsarges, and Dannevoux. The right had made a splendid advance into the woods south of Brioules-sur-Meuse, but the extreme left was meeting strong resistance in the Argonne. The attack continued without interruption, meeting six new divisions which the enemy threw into first line before September 29. He developed a powerful machine gun defense supported by heavy artillery fire, and made frequent counter-attacks with fresh troops, particularly on the front of the Twenty-eighth and Thirty-fifth Divisions. These divisions had taken Varennes, Cheppy, Baulny, and Charpentry, and the line was within 2 kilometers of Apremont. We were no longer engaged in a maneuver for the pinching out of a salient, but were necessarily committed, generally speaking, to a direct frontal attack against strong, hostile positions fully manned by a determined enemy.

37. By nightfall of the 29th the First Army line was approximately Bois de la Cote Lemont—Nantillois—Apremont—southwest across the Argonne. Many divisions, especially those in the center

that were subjected to cross-fire of artillery, had suffered heavily. The severe fighting, the nature of the terrain over which they attacked, and the fog and darkness sorely tried even our best divisions. On the night of the 29th the Thirty-seventh and Seventy-ninth Divisions were relieved by the Thirty-second and Third Divisions, respectively, and on the following night the First Division relieved the Thirty-fifth Division.

38. The critical problem during the first few days of the battle was the restoration of communications over "no man's land." There were but four roads available across this deep zone, and the violent artillery fire of the previous period of the war had virtually destroyed them. The spongy soil and the lack of material increased the difficulty. But the splendid work of our engineers and pioneers soon made possible the movement of the troops, artillery, and supplies most needed. By the afternoon of the 27th all the divisional artillery, except a few batteries of heavy guns, had effected a passage and was supporting the infantry action.

MEUSE-ARGONNE, SECOND PHASE.

39. At 5.30 a. m. on October 4 the general attack was renewed. The enemy divisions on the front from Fresnes-en-Woevre to the Argonne had increased from 10 in first line to 16, and included some of his best divisions. The fighting was desperate, and only small advances were realized, except by the First Division on the right of the First Corps. By evening of October 5 the line was approximately Bois de la Cote Lemont-Bois du Fays-Gesnes-Hill 240-Fleville-Chehery, southwest through the Argonne.

It was especially desirable to drive the enemy from his commanding positions on the heights east of the Meuse, but it was even more important that we should force him to use his troops there and weaken his tenacious hold on positions in our immediate front. The further stabilization of the new St. Mihiel line permitted the withdrawal of certain divisions for the extension of the Meuse-Argonne operation to the east bank of the Meuse River.

40. On the 7th the First Corps, with the Eighty-second Division added, launched a strong attack northwest toward Cornay, to draw attention from the movement east of the Meuse and at the same time outflank the German position in the Argonne. The following day the Seventeenth French Corps, Maj. Gen. Claudel commanding, initiated its attack east of the Meuse against the exact point on which the German armies must pivot in order to withdraw from northern France. The troops encountered elaborate fortifications and stubborn resistance, but by nightfall had realized an advance of 6 kilometers to a line well within the Bois de Consenvoye, and including

the villages of Beaumont and Haumont. Continuous fighting was maintained along our entire battle front, with especial success on the extreme left, where the capture of the greater part of the Argonne Forest was completed. The enemy contested every foot of ground on our front in order to make more rapid retirements farther west and withdraw his forces from northern France before the interruption of his railroad communications through Sedan.

41. We were confronted at this time by an insufficiency of replacements to build up exhausted divisions. Early in October combat units required some 90,000 replacements, and not more than 45,000 would be available before November 1 to fill the existing and prospective vacancies. We still had two divisions with the British and two with the French. A review of the situation, American and Allied, especially as to our own resources in men for the next two months, convinced me that the attack of the First Army and of the Allied Armies further west should be pushed to the limit. But if the First Army was to continue its aggressive tactics our divisions then with the French must be recalled, and replacements must be obtained by breaking up newly arrived divisions.

In discussing the withdrawal of our divisions from the French with Marshal Foch and Gen. Petain, on October 10, the former expressed his appreciation of the fact that the First Army was striking the pivot of the German withdrawal, and also held the view that the Allied attack should continue. Gen. Petain agreed that the American divisions with the French were essential to us if we were to maintain our battle against the German pivot. The French were, however, straining every nerve to keep up their attacks and, before those divisions with the French had been released, it became necessary for us to send the Thirty-seventh and Ninety-first Divisions from the First Army to assist the Sixth French Army in Flanders.

42. At this time the First Army was holding a front of more than 120 kilometers; its strength exceeded 1,000,000 men; it was engaged in the most desperate battle of our history, and the burden of command was too heavy for a single commander and staff. Therefore, on October 12, that portion of our front extending from Port-sur-Seille, east of the Moselle, to Fresnes-en-Woevre, south-east of Verdun, was transferred to the newly constituted Second Army with Lieut. Gen. Robert L. Bullard in command, under whom it began preparations for the extension of operations to the east in the direction of Briey and Metz. On October 16 the command of the First Army was transferred to Lieut. Gen. Hunter Liggett, and my advance headquarters was established at Ligny-en-Barrois, from which the command of the group of American Armies was exercised.

43. Local attacks of the First Army were continued in order particularly to adjust positions preparatory to a renewed general assault. The First and Fifth Divisions were relieved by the Forty-second and Eightieth Divisions, which were now fresh. An attack along the whole front was made on October 14. The resistance encountered was stubborn, but the stronghold on Cote Dame Marie was captured and the Hindenburg Line was broken. Cunel and Romagne-sous-Montfaucon were taken and the line advanced 2 kilometers north of Sommerance. A maximum advance of 17 kilometers had been made since September 26 and the enemy had been forced to throw into the fight a total of 15 reserve divisions.

During the remainder of the month important local operations were carried out, which involved desperate fighting. The First Corps, Maj. Gen. Dickman commanding, advanced through Grandpre; the Fifth Corps, Maj. Gen. Charles P. Summerall commanding, captured the Bois de Bantheville; the Third Corps, Maj. Gen. John L. Hines commanding, completed the occupation of Cunel Heights; and the Seventeenth French Corps drove the enemy from the main ridge south of La Grande Montagne. Particularly heavy fighting occurred east of the Meuse on October 18, and in the further penetration of the Kriemhilde-Stellung on October 23 the Twenty-sixth Division entering the battle at this time relieved the Eighteenth French Division.

44. Summarizing the material results which had been attained by the First Army by the end of October, we had met an increasing number of Germany's best divisions, rising from 20 in line and reserve on September 26, to 31 on October 31; the enemy's elaborately prepared positions, including the Hindenburg line, in our front had been broken; the almost impassable Argonne Forest was in our hands; an advance of 21 kilometers had been effected; 18,600 prisoners, 370 cannon, 1,000 machine guns, and a mass of material captured; and the great railway artery through Carignan to Sedan was now seriously threatened.

The demands of incessant battle which had been maintained day by day for more than a month had compelled our divisions to fight to the limit of their capacity. Combat troops were held in line and pushed to the attack until deemed incapable of further effort because of casualties or exhaustion; artillery once engaged was seldom withdrawn and many batteries fought until practically all the animals were casualties and the guns were towed out of line by motor trucks. The American soldier had shown unrivaled fortitude in this continuous fighting during most inclement weather and under many disadvantages of position. Through experience, the Army had developed into a powerful and smooth-running machine, and there

was a supreme confidence in our ability to carry through the task successfully.

While the high pressure of these dogged attacks was a great strain on our troops, it was calamitous to the enemy. His divisions had been thrown into confusion by our furious assaults, and his morale had been reduced until his will to resist had well-nigh reached the breaking point. Once a German division was engaged in the fight, it became practically impossible to effect its relief. The enemy was forced to meet the constantly recurring crises by breaking up tactical organizations and sending hurried detachments to widely separated portions of the field.

Every member of the American Expeditionary Forces, from the front line to the base ports, was straining every nerve. Magnificent efforts were exerted by the entire Services of Supply to meet the enormous demands made on it. Obstacles which seemed insurmountable were overcome daily in expediting the movements of replacements, ammunition and supplies to the front, and of sick and wounded to the rear. It was this spirit of determination animating every American soldier that made it impossible for the enemy to maintain the struggle until 1919.

MEUSE-ARGONNE, THIRD PHASE.

45. The detailed plans for the operations of the Allied Armies on the western front changed from time to time during the course of this great battle, but the mission of the First American Army to cut the great Carignan-Sedan-Mezieres Railroad remained unchanged. Marshal Foch coordinated the operations along the entire front, continuing persistently and unceasingly the attacks by all Allied Armies; the Belgian Army, with a French Army and two American divisions, advancing eastward; the British Armies and two American divisions, with the First French Army on their right, toward the region north of Givet; the First American Army and Fourth French Army, toward Sedan and Mezieres.

46. On the 21st my instructions were issued to the First Army to prepare thoroughly for a general attack on October 28, that would be decisive if possible. In order that the attack of the First Army and that of the Fourth French Army on its left should be simultaneous, our attack was delayed until November 1. The immediate purpose of the First Army was to take Buzancy and the heights of Barricourt, to turn the forest north of Grandpre, and to establish contact with the Fourth French Army near Boulton-aux-Bois. The Army was directed to carry the heights of Barricourt by nightfall of the first day and then to exploit this success by advancing its left to Boulton-aux-Bois in preparation for the drive toward Sedan. By strenuous

effort all available artillery had been moved well forward to the heights previously occupied by the enemy, from which it could fully cover and support the initial advance of the Infantry.

On this occasion and for the first time the Army prepared for its attack under normal conditions. We held the front of attack and were not under the necessity of taking over a new front, with its manifold installations and services. Our own personnel handled the communications, dumps, telegraph lines, and water service; our divisions were either on the line or close in rear; the French artillery, aviation, and technical troops which had previously made up our deficiencies had been largely replaced by our own organizations; and our army, corps, and divisional staffs were by actual experience second to none.

47. On the morning of November 1, three Army corps were in line between the Meuse River and the Bois de Bourgogne. On the right the Third Corps had the Fifth and Ninetieth Divisions; the Fifth Corps occupied the center of the line, with the Eighty-ninth and Second Divisions, and was to be the wedge of the attack on the first day; and on the left the First Corps deployed the Eightieth, Seventy-seventh, and Seventy-eighth Divisions.

Preceded by two hours of violent artillery preparation, the Infantry advanced, closely followed by "accompanying guns." The Artillery acquitted itself magnificently, the barrages being so well coordinated and so dense that the enemy was overwhelmed and quickly submerged by the rapid onslaught of the Infantry. By nightfall the Fifth Corps, in the center, had realized an advance of almost 9 kilometers, to the Bois de la Folie, and had completed the capture of the heights of Barricourt, while the Third Corps, on the right, had captured Ainereville and Andevanne. Our troops had broken through the enemy's last defense, captured his artillery positions, and had precipitated a retreat of the German forces about to be isolated in the forest north of Grandpre. On the 2d and 3d we advanced rapidly against heavy fighting on the fronts of the right and center corps; to the left the troops of the First Corps hurried forward in pursuit, some by motor trucks, while the Artillery pressed along the country roads close behind. Our heavy artillery was skillfully brought into position to fire upon the Carignan-Sedan Railroad and the junctions at Longuyon and Conflans. By the evening of the 4th, our troops had reached La Neuville, opposite Stenay, and had swept through the great Forêt de Dieulet, reaching the outskirts of Beaumont, while on the left we were 8 kilometers north of Boulton-aux-Bois.

The following day the advance continued toward Sedan with increasing swiftness. The Third Corps, turning eastward, crossed the

Meuse in a brilliant operation by the Fifth Division, driving the enemy from the heights of Dun-sur-Meuse and forcing a general withdrawal from the strong positions he had so long held on the hills north of Verdun.

By the 7th the right of the Third Corps had exploited its river crossing to a distance of 10 kilometers east of the Meuse, completely ejecting the enemy from the wooded heights and driving him out into the swampy plain of the Woivre; the Fifth and First Corps had reached the line of the Meuse River along their respective fronts and the left of the latter corps held the heights dominating Sedan, the strategical goal of the Meuse-Argonne operation, 41 kilometers from our point of departure on November 1. We had cut the enemy's main line of communications. Recognizing that nothing but a cessation of hostilities could save his armies from complete disaster, he appealed for an immediate armistice on November 6.

48. Meanwhile general plans had been prepared for the further employment of American forces in an advance between the Meuse and the Moselle, to be directed toward Longwy by the First Army, while the Second Army was to assume the offensive toward the Briey Iron Basin. Orders directing the preparatory local operations involved in this enterprise were issued on November 5.

Between the 7th and 10th of November the Third Corps continued its advance eastward to Remoiville, while the Seventeenth French Corps, on its right, with the Seventy-ninth, Twenty-sixth, and Eighty-first American Divisions, and 2 French divisions, drove the enemy from his final foothold on the heights east of the Meuse. At 9 p. m. on November 9 appropriate orders were sent to the First and Second Armies in accordance with the following telegram from Marshal Foch to the Commander of each of the Allied armies:

"The enemy, disorganized by our repeated attacks, retreats along the entire front.

It is important to coordinate and expedite our movements.

I appeal to the energy and the initiative of the Commanders-in-Chief and of their armies to make decisive the results obtained."

In consequence of the foregoing instructions, our Second Army pressed the enemy along its entire front. On the night of the 10th-11th and the morning of the 11th the Fifth Corps, in the First Army, forced a crossing of the Meuse east of Beaumont and gained the commanding heights within the reentrant of the river, thus completing our control of the Meuse River line. At 6 a. m. on the 11th notification was received from Marshal Foch's headquarters that the Armistice had been signed and that hostilities would cease at 11 a. m. Preparatory measures had already been taken to insure the prompt transmission to the troops of the announcement of an Armistice. However, the advance east of Beaumont on the morning of the 11th

had been so rapid and communication across the river was so difficult that there was some fighting on isolated portions of that front after 11 a. m.

49. Between September 26 and November 11, 22 American and 4 French divisions, on the front extending from southeast of Verdun to the Argonne Forest, had engaged and decisively beaten 47 different German divisions, representing 25 per cent of the enemy's entire divisional strength on the western front. Of these enemy divisions 20 had been drawn from the French front and 1 from the British front. Of the 22 American divisions 12 had, at different times during this period, been engaged on fronts other than our own. The First Army suffered a loss of about 117,000 in killed and wounded. It captured 26,000 prisoners, 847 cannon, 3,000 machine guns, and large quantities of material.

The dispositions which the enemy made to meet the Meuse-Argonne offensive, both immediately before the opening of the attack and during the battle, demonstrated the importance which he ascribed to this section of the front and the extreme measures he was forced to take in its defense. From the moment the American offensive began until the Armistice, his defense was desperate and the flow of his divisions to our front was continuous. The rate at which German divisions were used up is illustrated by plate 7, which shows an increase of 27 divisions on the American front during the battle.

OPERATIONS OF THE SECOND ARMY.

50. Under the instructions issued by me on November 5, for operations by the Second Army in the direction of the Briey Iron Basin, the advance was undertaken along the entire front of the army and continued during the last three days of hostilities. In the face of the stiff resistance offered by the enemy, and with the limited number of troops at the disposal of the Second Army, the gains realized reflected great credit on the divisions concerned. On November 6 Marshal Foch requested that 6 American divisions be held in readiness to assist in an attack which the French were preparing to launch in the direction of Chateau-Salins. The plan was agreed to, but with the provision that our troops should be employed under the direction of the commanding general Second Army.

This combined attack was to be launched on November 14, and was to consist of 20 French divisions under Gen. Mangin and the 6 American divisions under Gen. Bullard. Of the divisions designated for this operation the Third, Fourth, Twenty-ninth, and Thirty-sixth were in Army reserve and were starting their march eastward on the morning of November 11, while the Twenty-eighth and Thirty-fifth were being withdrawn from line on the Second Army front.

AMERICAN ACTIVITIES ON OTHER FRONTS.

51. During the first phase of the Meuse-Argonne battle, American divisions were participating in important attacks on other portions of the front. The Second Army Corps, Maj. Gen. Read, commanding, with the Twenty-seventh and Thirtieth Divisions on the British front, was assigned the task in cooperation with the Australian Corps, of breaking the Hindenburg line at Le Cateau, where the St. Quentin Canal passes through a tunnel under a ridge. In this attack, carried out on September 29 and October 1, the Thirtieth Division speedily broke through the main line of defense and captured all of its objectives, while the Twenty-seventh progressed until some of its elements reached Gouy. In this and later actions from October 6 to 19, our Second Corps captured over 6,000 prisoners and advanced about 24 kilometers.

52. On October 2-9 our Second and Thirty-sixth Divisions assisted the Fourth French Army in its advance between Rheims and the Argonne. The Second Division completed its advance on this front by the assault of the wooded heights of Mont Blanc, the key point of the German position, which was captured with consummate dash and skill. The division here repulsed violent counterattacks, and then carried our lines into the village of St. Etienne, thus forcing the Germans to fall back before Rheims and yield positions which they had held since September, 1914. On October 10 the Thirty-sixth Division relieved the Second, exploiting the latter's success, and in two days advanced, with the French, a distance of 21 kilometers, the enemy retiring behind the Aisne River.

53. In the middle of October, while we were heavily engaged in the Meuse-Argonne, Marshal Foch requested that 2 American divisions be sent immediately to assist the Sixth French Army in Belgium, where slow progress was being made. The Thirty-seventh and Ninety-first Divisions, the latter being accompanied by the Artillery of the Twenty-eighth Division, were hurriedly dispatched to the Belgian front. On October 30, in continuation of the Flanders offensive, these divisions entered the line and attacked. By November 3 the Thirty-seventh Division had completed its mission by rapidly driving the enemy across the Escaut River and had firmly established itself on the east bank, while the Ninety-first Division, in a spirited advance, captured Spitaals Bosschen, reached the Scheldt, and entered Audenarde.

AMERICAN TROOPS IN ITALY.

54. The Italian Government early made request for American troops, but the critical situation on the western front made it necessary to concentrate our efforts there. When the Secretary of War

was in Italy during April, 1918, he was urged to send American troops to Italy to show America's interest in the Italian situation and to strengthen Italian morale. Similarly a request was made by the Italian Prime Minister at the Abbeville conference. It was finally decided to send one regiment to Italy with the necessary hospital and auxiliary services, and the Three hundred and thirty-second Infantry was selected, reaching the Italian front in July, 1918. These troops participated in action against the Austrians in the fall of 1918 at the crossing of the Piave River and in the final pursuit of the Austrian Army.

AMERICAN TROOPS IN RUSSIA.

55. It was the opinion of the Supreme War Council that Allied troops should be sent to cooperate with the Russians, either at Murmansk or Archangel, against the Bolshevist forces, and the British Government, through its ambassador at Washington, urged American participation in this undertaking. On July 23, 1918, the War Department directed the dispatch of three battalions of Infantry and three companies of Engineers to join the Allied expedition. In compliance with these instructions the Three hundred and thirty-ninth Infantry, the First Battalion, Three hundred and tenth Engineers, Three hundred and thirty-seventh Field Hospital Company, and Three hundred and thirty-seventh Ambulance Company were sent through England, whence they sailed on August 26.

The mission of these troops was limited to guarding the ports and as much of the surrounding country as might develop threatening conditions. The Allied force operated under British command, through whose orders the small American contingent was spread over a front of about 450 miles. From September, 1918, to May, 1919, a series of minor engagements with the Bolshevist forces occurred, in which 82 Americans were killed and 7 died of wounds.

In April, 1919, two companies of American railroad troops were added to our contingent. The withdrawal of the American force commenced in the latter part of May, 1919, and on August 25 there was left only a small detachment of Graves Registration troops.

THE ADVANCE INTO GERMANY.

56. In accordance with the terms of the Armistice, the Allies were to occupy all German territory west of the Rhine, with bridgeheads of 30 kilometer radius at Cologne, Coblenz, and Mayence. The zone assigned the American command was the bridgehead of Coblenz and the district of Treves. This territory was to be occupied by an American Army, with its reserves held between the Moselle-Meuse Rivers and the Luxemburg frontier.

The instructions of Marshal Foch, issued on November 16, contemplated that 2 French infantry divisions and 1 French cavalry division would be added to the American forces that occupied the Coblenz bridgehead, and that 1 American division would be added to the French force occupying the Mayence bridgehead. As this arrangement presented possibilities of misunderstanding due to difference of views regarding the government of occupied territory, it was represented to the Marshal that each nation should be given a well-defined territory of occupation, employing within such territory only the troops of the commander responsible for the particular zone. On December 9 Marshal Foch accepted the principle of preserving the entity of command and troops, but reduced the American bridgehead by adding a portion of the eastern half to the French command at Mayence.

57. Various reasons made it undesirable to employ either the First or Second Army as the Army of Occupation. Plans had been made before the Armistice to organize a Third Army and, on November 14, this army, with Maj. Gen. Joseph T. Dickman as commander, was designated as the Army of Occupation. The Third and Fourth Army Corps staffs and troops, less artillery, the First, Second, Third, Fourth, Thirty-second, and Forty-second Divisions, and the Sixty-sixth Field Artillery Brigade were assigned to the Third Army. This force was later increased by the addition of the Seventh Corps, Maj. Gen. William M. Wright commanding, with the Fifth, Eighty-ninth, and Ninetieth Divisions.

The advance toward German territory began on November 17 at 5 a. m., six days after signing the Armistice. All of the allied forces from the North Sea to the Swiss border moved forward simultaneously in the wake of the retreating German armies. Upon arrival at the frontier, a halt was made until December 1, when the leading elements of all Allied armies crossed the line into Germany. The Third Army Headquarters were established at Coblenz and an Advance General Headquarters located at Treves. Steps were immediately taken to organize the bridgehead for defense, and dispositions were made to meet a possible renewal of hostilities.

The advance to the Rhine required long arduous marches, through cold and inclement weather, with no opportunity for troops to rest, refit, and refresh themselves after their participation in the final battle. The Army of Occupation bore itself splendidly and exhibited a fine state of discipline both during the advance and throughout the period of occupation.

58. The zone of march of our troops into Germany and the line of communications of the Third Army after reaching the Rhine lay through Luxemburg. After the passage of the Third Army, the occupation of Luxemburg, for the purpose of guarding our line of

communications, was intrusted to the Fifth and Thirty-third Divisions of the Second Army. The city of Luxemburg, garrisoned by French troops and designated as the headquarters of the Allied Commander-in-Chief, was excluded from our control.

Upon entering the Duchy of Luxemburg in the advance, a policy of noninterference in the affairs of the Grand Duchy was announced. Therefore, when the French commander in the city of Luxemburg was given charge of all troops in the Duchy, in so far as concerned the "administration of the Grand Duchy of Luxemburg," my instructions were that our troops would not be subject to his control. Later, at my request, and in order to avoid possible friction, Marshal Foch placed the entire Duchy in the American Zone.

RETURN OF TROOPS TO THE UNITED STATES.

59. On the day the Armistice was signed, the problem of the return of our troops to the United States was taken up with the War Department and, on November 15, a policy recommended of sending home certain auxiliaries so that we could begin to utilize all available shipping without delay. On December 21 the War Department announced by cable that it had been decided to begin immediately the return of our forces and continue as rapidly as transportation would permit. To carry this out, a schedule for the constant flow of troops to the ports was established, having in mind our international obligations pending the signing of the treaty of peace.

60. While more intimately related to the functions of the Services of Supply than to Operations, it is logical to introduce here a brief recital of the organizations created for the return of our troops to America. Prior to the Armistice but 15,000 men had been returned home. Although the existing organization was built for the efficient and rapid handling of the incoming forces, the embarkation of this small number presented no difficulties. But the Armistice suddenly and completely reversed the problem of the Services of Supply at the ports and the handling of troops. It became necessary immediately to reorganize the machinery of the ports, to construct large embarkation camps, and to create an extensive service for embarking the homeward-bound troops.

Brest, St. Nazaire, and Bordeaux became the principal embarkation ports, Marseilles and Le Havre being added later to utilize Italian and French liners. The construction of the embarkation camps during unseasonable winter weather was the most trying problem. These, with the billeting facilities available, gave accommodation for 55,000 at Brest, 44,000 at St. Nazaire, and 130,000 at Bordeaux. Unfortunately, the largest ships had to be handled at Brest, where the least shelter was available.

To maintain a suitable reservoir of men for Brest and St. Nazaire, an Embarkation Center was organized around Le Mans, which eventually accommodated 230,000 men. Here the troops and their records were prepared for the return voyage and immediate demobilization. As the troops arrived at the base ports, the embarkation service was charged with feeding, reclothing, and equipping the hundreds of thousands who passed through, which required the maintenance of a form of hotel service on a scale not hitherto attempted.

61. On November 16 all combat troops, except 30 divisions and a minimum of corps and army troops, were released for return to the United States. It was early evident that only limited use would be made of the American divisions, and that the retention of 30 divisions was not necessary. Marshal Foch considered it indispensable to maintain under arms a total, including Italians, of 120 to 140 divisions, and he proposed that we maintain 30 divisions in France until February 1, 25 of which should be held in the Zone of the Armies, and that on March 1 we should have 20 divisions in the Zone of the Armies and 5 ready to embark. The plan for March 1 was satisfactory, but the restrictions as to the divisions that should be in France on February 1 could not be accepted, as it would seriously interfere with the flow of troops homeward.

In a communication dated December 24 the Marshal set forth the minimum forces to be furnished by the several Allies, requesting the American Army to furnish 22 to 25 divisions of Infantry. In the same note he estimated the force to be maintained after the signing of the preliminaries of peace at about 32 divisions, of which the American Army was to furnish 6.

In reply it was pointed out that our problem of repatriation of troops and their demobilization was quite different from that of France or Great Britain. On account of our long line of communications in France and the time consumed by the ocean voyage and travel in the United States, even with the maximum employment of our then available transportation, at least a year must elapse before we could complete our demobilization. Therefore, it was proposed by me that the number of American combat divisions to be maintained in the Zone of the Armies should be reduced on April 1 to 15 divisions and on May 1 to 10 divisions, and that in the unexpected event that the preliminaries of peace should not be signed by May 1 we would continue to maintain 10 divisions in the Zone of the Armies until the date of signature.

The Allied Commander-in-Chief later revised his estimate, and, on January 24, stated to the Supreme War Council that the German demobilization would permit the reduction of the Allied forces to 100 divisions, of which the Americans were requested to furnish 15. In reply, it was again pointed out that our problem was entirely one

of transportation, and that such a promise was unnecessary inasmuch as it would probably be the summer of 1919 before we could reduce our forces below the number asked. We were, therefore, able to keep our available ships filled, and by May 19 all combat divisions, except 5 still in the Army of Occupation, were under orders to proceed to ports of embarkation. This provided sufficient troops to utilize all troop transports to include July 15.

62. The President had informed me that it would be necessary for us to have at least one regiment in occupied Germany, and left the details to be discussed by me with Marshal Foch. My cable of July 1 summarizes the agreement reached:

"By direction of President, I have discussed with Marshal Foch question of forces to be left on the Rhine. Following agreed upon: The Fourth and Fifth Divisions will be sent to base ports immediately, the Second Division will commence moving to base ports on July 15, and the Third Division on August 15. Date of relief of First Division will be decided later. Agreement contemplates that after compliance by Germany with military conditions to be completed within first three months after German ratification of treaty, American force will be reduced to one regiment of Infantry and certain auxiliaries. Request President be informed of agreement."

As a result of a later conference with Marshal Foch, the Third Division was released on August 3 and the First Division on August 15.

PART III.

SUPPLY, COORDINATION, MUNITIONS, AND ADMINISTRATION.

THE SERVICES OF SUPPLY.

1. In February, 1918, the Line of Communications was reorganized under the name of the Services of Supply. At that time all staff services and departments, except The Adjutant General's, the Inspector General's, and the Judge Advocate General's Departments, were grouped for supply purposes under one coordinating head, the Commanding General, Services of Supply, with a General Staff paralleling, so far as necessary, the General Staff at General Headquarters.

The principal functions of the Services of Supply were the procurement, storage, and transportation of supplies. These activities were controlled in a general way by the commanding general Services of Supply, the maximum degree of independence being permitted to the several services. This great organization was charged with immense projects in connection with roads, docks, railroads, and buildings; the transportation of men, animals, and supplies by sea, rail, and inland waterways; the operation of telegraph and telephone systems; the control and transportation of replacements; the hospitalization necessary for an army of 2,000,000 men; the reclassification of numerous officers and men; the establishment of leave areas and of welfare and entertainment projects; the liquidation of our affairs in France; and the final embarkation of our troops for home.

The growth of the permanent port personnel, the location near the base ports of certain units for training, and other considerations led to the appointment of a territorial commander for the section around each port who, while acting as the representative of the commanding general Services of Supply, was given the local authority of a district commander. For similar reasons, an Intermediate Section Commander and an Advance Section Commander were appointed. Eventually there were nine base sections, including one in England, one in Italy, and one comprising Rotterdam and Antwerp, also one intermediate and one advance section.

The increasing participation of the American Expeditionary Forces in active operations necessitated the enlargement of the responsibilities and authority of the commanding general Services of Supply. In August, 1918, he was charged with complete responsibility for all supply matters in the Services of Supply, and was authorized to correspond by cable directly with the War Department on all matters of supply not involving questions of policy.

In the following discussion of the Services of Supply the subjects of coordination of supply at the front, ocean tonnage, and replacements are included for convenience, though they were largely or entirely under the direct control of General-Staff Sections at my headquarters.

COORDINATION OF SUPPLY AT THE FRONT.

2. Our successful participation in the war required that all the different services immediately concerned with the supply of combat troops should work together as a well-regulated machine. In other words, there must be no duplication of effort, but each must perform its functions without interference with any other service. The Fourth Section of the General Staff was created to control impartially all these services, and, under broad lines of policy, to determine questions of transportation and supply in France and coordinate our supply services with those of the Allies.

This section did not work out technical details but was charged with having a general knowledge of existing conditions as to supply, its transportation, and of construction affecting our operations or the efficiency of our forces. It frequently happened that several of the supply departments desired the same site for the location of installations, so that all plans for such facilities had to be decided in accordance with the best interests of the whole.

3. In front of the advance depots, railroad lines and shipments to troops had to be carefully controlled, because mobility demanded that combat units should not be burdened with a single day's stores above the authorized standard reserve. Furthermore, accumulations at the front were exposed to the danger of destruction or capture and might indicate our intentions. Each combat division required the equivalent of 25 French railway car loads of supplies for its daily consumption to be delivered at a point within reach of motor or horse-drawn transportation. The regular and prompt receipt of supplies by combatant troops is of first importance in its effect upon the morale of both officers and men. The officer whose mind is pre-occupied by the question of food, clothing, or ammunition, is not free to devote his energy to training his men or to fighting the enemy. It is necessary that paper work be reduced to an absolute

minimum and that the delivery of supplies to organizations be placed on an automatic basis as far as possible.

4. The principle of flexibility had to be borne in mind in planning our supply system in order that our forces should be supplied, no matter what their number, or where they might be called upon to enter the line. This high degree of elasticity and adaptability was assured and maintained through the medium of the regulating station. It was the connecting link between the armies and the services in the rear, and regulated the railroad transportation which tied them together. The regulating officer at each such station was a member of the Fourth Section of my General Staff, acting under instructions from his chief of section.

Upon the regulating officer fell the responsibility that a steady flow of supply was maintained. He must meet emergency shipments of ammunition or engineering material, sudden transfers of troops by rail, the hastening forward of replacements, or the unexpected evacuation of wounded. All the supply services naturally clamored to have their shipments rushed through. The regulating officer, acting under special or secret instructions, must declare priorities in the supply of things the Army needed most. Always informed of the conditions at the front, of the status of supplies, and of military plans and intentions, nothing could be shipped to the regulating station or in front of the advance depots except on his orders. The chiefs of supply services fulfilled their responsibilities when they delivered to the regulating officer the supplies called for by him, and he met his obligation when these supplies were delivered at the proper railheads at the time they were needed. The evacuation of the wounded was effected over the same railroad lines as those carrying supplies to the front, therefore, this control had also to be centralized in the regulating officer.

The convenient location of the regulating stations was of prime importance. They had to be close enough to all points in their zones to permit trains leaving after dusk or during the night to arrive at their destinations by dawn. They must also be far enough to the rear to be reasonably safe from capture. Only two regulating stations were actually constructed by us in France, Is-sur-Tille and Liffol-le-Grand, as the existing French facilities were sufficient to meet our requirements beyond the reach of those stations.

As far as the regulating officer was concerned, supplies were divided into four main classes. The first class constituted food, forage and fuel, needed and consumed every day; the second, uniforms, shoes, blankets and horse shoes, which wear out with reasonable regularity; the third, articles of equipment which require replacement at irregular intervals, such as rolling kitchens, rifles and escort

wagons; the fourth class covered articles, the flow of which depended upon tactical operations, such as ammunition and construction material. Articles in the first class were placed on an automatic basis, but formal requisition was eliminated as far as possible for all classes.

5. In order to meet many of the immediate needs of troops coming out of the line and to relieve to some extent the great strain on the railheads during active fighting, a system of army depots was organized. These depots were supplied by bulk shipments from the advance depots through the regulating stations during relatively quiet periods. They were under the control of the chiefs of the supply services of the armies and required practically no construction work, the supplies being stored in open places protected only by dunnage and camouflaged tarpaulins.

6. The accompanying diagram illustrates graphically the supply system which supported our armies in France. The Services of Supply can be likened to a great reservoir divided into three main parts—the base depots, the intermediate depots and the advance depots. The management of this reservoir is in charge of the commanding general, Services of Supply, who administers it with a free hand, controlled only by general policies outlined to him from time to time. Each of the supply and technical services functions independently in its own respective sphere; each has its share of storage space in the base depots, in the intermediate depots, and in the advance depots. Then comes the distribution system, and here the control passes to the chief of the Fourth Section of the General Staff, who exercises his powers through the regulating stations.

PURCHASING AGENCY.

7. The consideration of requirements in food and material led to the adoption of an automatic supply system, but, with the exception of foodstuffs, there was an actual shortage, especially in the early part of the war, of many things, such as equipment pertaining to land transportation and equipment and material for combat. The lack of ocean tonnage to carry construction material and animals at the beginning was serious. Although an increasing amount of shipping became available as the war progressed, at no time was there sufficient for our requirements. The tonnage from the States reached about seven and one-half million tons to December 31, 1918, which was a little less than one-half of the total amount obtained.

The supply situation made it imperative that we utilize European resources as far as possible for the purchase of material and supplies. If our Services of Supply departments had entered the market of

Europe as purchasers without regulation or coordination, they would have been thrown into competition with each other, as well as with buyers from the Allied armies and the civil populations. Such a system would have created an unnatural elevation of prices, and would have actually obstructed the procurement of supplies. To meet this problem from the standpoint of economical business management, directions were given in August, 1917, for the creation of a General Purchasing Board to coordinate and control our purchases both among our own services and among the Allies as well. The supervision and direction of this agency was placed in the hands of an experienced business man, and every supply department in the American Expeditionary Forces was represented on the board. Agents were stationed in Switzerland, Spain, and Holland, besides the Allied countries. The character of supplies included practically the entire category of necessities, although the bulk of our purchases consisted of raw materials for construction, ordnance, air equipment, and animals. A total of about 10,000,000 tons was purchased abroad by this agency to December 31, 1918, most of which was obtained in France.

The functions of the Purchasing Agency were gradually extended until they included a wide field of activities. In addition to the coordination of purchases, the supply resources of our Allies were reconnoitered and intimate touch was secured with foreign agencies; a Statistical Bureau was created which classified and analyzed our requirements; quarterly forecasts of supplies were issued; civilian manual labor was procured and organized; a Technical Board undertook the coordination, development, and utilization of the electric power facilities in France; a Bureau of Reciprocal Supplies viséed the claims of foreign governments for raw materials from the United States; and a general printing plant was established. Some of these activities were later transferred to other services as the latter became ready to undertake their control.

The principles upon which the usefulness of this agency depended were extended to our Allies, and in the summer of 1918 the General Purchasing Agent became a member of the Interallied Board of Supplies. This Board undertook, with signal success, to coordinate the supply of the Allied armies in all those classes of material necessities that were in common use in all the armies. The possibility of immense savings were fully demonstrated, but the principles had not become of general application before the Armistice.

OCEAN TONNAGE.

8. Following a study of tonnage requirements, an officer was sent to Washington in December, 1917, with a general statement of the

shipping situation in France as understood by the Allied Maritime Council. In March, 1918, tonnage requirements for transport and maintenance of 900,000 men in France by June 30 were adopted as a basis upon which to calculate supply requisitions and the allocation of tonnage.

In April the Allied Maritime Transport Council showed that requirements for 1918 greatly exceeded the available tonnage. Further revisions of the schedule were required by the Abbeville Agreement in May, under which American infantry and machine gun units were to be transported in British shipping, and by the Versailles Agreement in June.

In July, a serious crisis developed as the allotment for August made the American Expeditionary Forces by the Shipping Control Committee was only 575,000 dead-weight tons, afterwards increased to 700,000, whereas 803,000 tons (not including animals) were actually needed. It was strongly urged by me that more shipping be diverted from trades and that a larger percentage of new shipping be placed in transport service.

9. Early in 1918, a scheme had been proposed which would provide priority for essential supplies only, based upon monthly available tonnage in sight. Although it was the understanding that calls for shipping should be based upon our actual needs, much irregularity was found in tonnage allotments, as shown by the following cables sent September 14, 1918.

"The following variations from cable orders are noticeable:

Q. M. supplies cabled for, for August delivery, 182,287 short tons.

Q. M. supplies actually received during August, 231,850 short tons.

T. D. supplies (rolling stock, etc.) called for, for August delivery, 113,482 short tons.

T. D. supplies actually received during August, 67,521 short tons."

"You must prepare to ship supplies we request, instead of shipping excessive amounts of supplies of which we have a due proportion."

"An increase in the allotment of tonnage must be made, even for September. It is imperative. I can not too strongly urge that the allotment be reconsidered in the light of the above showing of our deficiencies. * * *" "At the present time our ability to supply and maneuver our forces depends largely on motor transportation * * *. We are able to carry out present plans due to fact that we have been able to borrow temporarily large numbers of trucks and ambulances from the French * * *. The shortage of ambulances to move our wounded is critical * * *. We have reached the point where we can no longer improvise or borrow. The most important plans and operations depend upon certainty that the home Government will deliver at French ports material and equipment cabled for. It is urged that foregoing be given most serious consideration and that tonnage allotted for supply of Army in France be sufficient to deliver material and equipment, properly proportioned in kinds and amount, to meet the needs of our troops * * *."

The following is a brief summary of the tonnage asked for and the amount actually received in France during the critical period from July to October, 1918:

Month.	Cabled for by American Ex- peditionary Forces.	Received in France from United States.	Shortage.
July.....	¹ 480,891	438,047	42,844
August.....	700,527	511,261	189,266
September.....	869,438	539,018	330,420
October.....	1,022,135	623,689	398,446
Total.....	3,072,991	2,112,015	960,976

¹ Tons of 2,000 pounds.

REPLACEMENTS OF PERSONNEL.

10. Under the original organization project there were to be two divisions in each corps of six divisions which were to be used as reservoirs of replacements. One half of the Artillery and other auxiliaries of these two divisions were to be utilized as corps and army troops. They were to supply the first demands for replacements from their original strength, after which a minimum of 3,000 men per month for each army corps in France was to be forwarded to them from the United States. It was estimated that this would give a sufficient reservoir of personnel to maintain the fighting strength of combat units, provided the sick and wounded were promptly returned to their own units upon recovery.

The Thirty-second and Forty-first Divisions were the first to be designated as replacement and depot divisions of the First Army Corps, but the situation soon became such that the Thirty-second Division had to be employed as a combat division. For the same reason all succeeding divisions had to be trained for combat, until June 27, when the need for replacements made it necessary to designate the Eighty-third as a depot division.

11. By the middle of August we faced a serious shortage of replacements. Divisions had arrived in France below strength, and each division diverted from replacement to combat duty increased the number of divisions to be supplied and at the same time decreased the supply.

On August 16 the War Department was cabled, as follows:

"Attention is especially invited to the very great shortage in arrivals of replacements heretofore requested. Situation with reference to replacements is now very acute. Until sufficient replacements are available in France to keep our proven divisions at full strength, replacements should by all means be sent in preference to new divisions."

At this time it became necessary to transfer 2,000 men from each of three combat divisions (the Seventh, Thirty-sixth, and Eighty-first) to the First Army, in preparation for the St. Mihiel offensive.

By the time the Meuse-Argonne offensive was initiated the replacement situation had become still more acute. The Infantry and Machine gun units of the Eighty-fourth and Eighty-sixth Divisions, then in the vicinity of Bordeaux, were utilized as replacements, leaving only a cadre of two officers and twenty-five men for each company. To provide immediate replacements during the progress of the battles new replacement organizations were formed in the Zone of Operations; at first, as battalions, and later, as regional replacement depots.

12. On October 3, a cable was sent the War Department, reading as follows:

"Over 50,000 of the replacements requested for the months of July, August, and September have not yet arrived. Due to extreme seriousness of the replacement situation, it is necessary to utilize personnel of the Eighty-fourth and Eighty-sixth Divisions for replacement purposes. Combat divisions are short over 80,000 men. Vitally important that all replacements due, including 55,000 requested for October, be shipped early in October. If necessary, some divisions in United States should be stripped of trained men and such men shipped as replacements at once."

Altogether seven divisions had to be skeletonized, leaving only one man per company and one officer per regiment to care for the records. As a further measure to meet the situation, the authorized strength of divisions was reduced in October by 4,000 men, thus lowering the strength of each Infantry company to approximately 174 men. The 30 combat divisions in France at that time needed 103,513 Infantry and machine gun replacements, and only 66,490 were available.

Attention of the War Department was invited on November 2 to the fact that a total of 140,000 replacements would be due by the end of November, and the cable closed by saying:

"To send over entire divisions, which must be broken up on their arrival in France so we may obtain replacements that have not been sent as called for, is a wasteful method, and one that makes for inefficiency; but as replacements are not otherwise available, there is no other course open to us. New and only partially trained divisions can not take the place of older divisions that have had battle experience. The latter must be kept up numerically to the point of efficiency * * *."

REMOUNTS.

13. The shortage of animals was a serious problem throughout the war. In July, 1917, the French agreed to furnish our forces with 7,000 animals a month, and accordingly the War Department was requested to discontinue shipments. On August 24, however, the French advised us that it would be impossible to furnish the number of animals originally stated, and Washington was again asked to supply animals, but none could be sent over until November, and then only a limited number.

Early in 1918, after personal intervention and much delay, the French Government made requisition on the country, and we were able to obtain 50,000 animals. After many difficulties, the Purchasing Board was successful in obtaining permission, in the summer of 1918, to export animals from Spain, but practically no animals were received until after the Armistice.

Every effort was made to reduce animal requirements—by increased motorization of artillery and by requiring mounted officers and men to walk—but in spite of all these efforts, the situation as to animals grew steadily worse. The shortage by November exceeded 106,000, or almost one-half of all our needs. To relieve the crisis in this regard, during the Meuse-Argonne battle, Marshal Foch requisitioned 13,000 animals from the French Armies and placed them at my disposal.

RECLASSIFICATION OF PERSONNEL.

14. An important development in the Services of Supply was the reclassification system for officers and men. This involved not only the physical reclassification of those partially fit for duty, but also the reclassification of officers according to fitness for special duties. A number of officers were found unfit for combat duty, and many in noncombatant positions were found unsuited to the duties on which employed. An effort was made to reassign these officers to the advantage of themselves and the Army. A total of 1,101 officers were reclassified in addition to the disabled, and 270 were sent before efficiency boards for elimination. 962 wounded or otherwise disabled officers were reclassified, their services being utilized to release officers on duty with the Services of Supply who were able to serve with combat units.

CONSTRUCTION BY ENGINEER CORPS.

15. Among the most notable achievements of the American Expeditionary Forces was the large program of construction carried out by our Engineer troops in the Services of Supply and elsewhere. The chief projects were port facilities including docks, railroads, warehouses, hospitals, barracks, and stables. These were planned to provide ultimately for an army of 4,000,000 men, the construction being carried on coincident with the growth of the American Expeditionary Forces.

The port plans contemplated 160 new berths, including the necessary facilities for discharge of cargo, approximately one-half of which were completed at the time of the Armistice. Construction of new standard-gauge railroad track amounted to 1,002 miles, consisting mainly of cut-offs, double tracking at congested points, and yards at ports and depots. Road construction and repair continued

until our troops were withdrawn from the several areas, employing at times upward of 10,000 men, and often using 90,000 tons of stone per week.

Storage requirements necessitated large supply depots at the ports and in the intermediate and advance sections. Over 2,000,000 square feet of covered storage was secured from the French, but it was necessary to construct approximately 20,000,000 square feet additional. The base hospital centers at Mars and Mesves, each with 4,000-bed convalescent camps, are typical of the large scale upon which hospital accommodations were provided. The hospital city at Mars, of 700 buildings, covered a ground space of 33 acres and included the usual road, water, sewerage, and lighting facilities of a municipality.

16. Advantages of economy and increased mobility caused the adoption of the system of billeting troops. Billeting areas were chosen near the base ports, along the line of communications, and in the advanced zone, as strategical requirements dictated. The system was not altogether satisfactory, but with the number of troops to be accommodated no other plan was practicable. Demountable barracks were used for shelter to supplement lack of billets, 16,000 barracks of this type being erected, particularly at base ports where large camps were necessary. Stables at remount stations were built for 43,000 animals. Other construction included refrigerating plants, such as the one at Gievres with a capacity of 6,500 tons of meat and 500 tons of ice per day; and mechanical bakeries like that at Is-sur-Tille with capacity of 800,000 pounds of bread per day. If the buildings constructed were consolidated, with the width of a standard barrack, they would reach from St. Nazaire across France to the Elbe River in Germany, a distance of 730 miles.

In connection with construction work, the Engineer Corps engaged in extensive forestry operations, producing 200,000,000 feet of lumber, 4,000,000 railroad ties, 300,000 cords of fuel wood, 35,000 pieces of piling, and large quantities of miscellaneous products.

TRANSPORTATION CORPS.

17. The Transportation Corps as a separate organization was new to our Army. Its exact relation to the supply departments was conceived to be that of a system acting as a common carrier operating its own ship and rail terminals. The equipment and operation of port terminals stands out as a most remarkable achievement. The amount of tonnage handled at all French ports grew slowly, reaching about 17,000 tons daily at the end of July, 1918. An emergency then developed as a result of the critical military situation, and the capacity of our terminals was so efficiently increased that, by November 11, 45,000 tons were being handled daily.

The French railroads, both in management and material, had dangerously deteriorated during the war. As our system was superimposed upon that of the French it was necessary to provide them with additional personnel and much matériel. Experienced American railroad men brought into our organization, in various practical capacities, the best talent in the country, who, in addition to the management of our own transportation, materially aided the French. The relation of our Transportation Corps to the French railroads and to our own supply departments presented many difficulties, but these were eventually overcome and a high state of efficiency established.

18. It was early decided, as expedient for our purposes, to use American rolling stock on the French railroads, and approximately 20,000 cars and 1,500 standard-gauge locomotives were brought from the United States and assembled by our railroad troops. We assisted the French by repairing with our own personnel 57,385 French cars, and 1,947 French locomotives. The lack of rolling stock for Allied use was at all times a serious handicap, so that the number of cars and locomotives built and repaired by us was no small part of our contribution to the Allied cause.

QUARTERMASTER CORPS.

19. The Quartermaster Corps was able to provide a larger tonnage of supplies from the States than any of the great supply departments. The operations of this corps were so large and the activities so numerous that they can best be understood by a study of the report of the commanding general Services of Supply.

The Quartermaster Corps in France was called upon to meet conditions never before presented, and it was found advisable to give it relief. Transportation problems by sea transport and by rail were handled by separate corps organized for that purpose, and already described. Motor transport was also placed under an organization of its own. The usual routine supplies furnished by this department reached enormous proportions. Except for the delay early in 1918 in obtaining clothing and the inferior quality of some that was furnished, and an occasional shortage in forage, no army was ever better provided for. Special services created under the Quartermaster Corps included a Remount Service, which received, cared for, and supplied animals to troops; a Veterinary Service, working in conjunction with the remount organization; an Effects Section and Baggage Service; and a Salvage Service for the recovery and preparation for reissue of every possible article of personal equipment. Due to the activities of the Salvage Service, an estimated saving of \$85,000,000 was realized, tonnage and raw material were

conserved, and what in former wars represented a distinct liability was turned into a valuable asset.

The Graves Registration Service, also under the Quartermaster Corps, was charged with the acquisition and care of cemeteries, the identification and reburial of our dead, and the correspondence with relatives of the deceased. Central cemeteries were organized on the American battle fields, the largest being at Romagne-sous-Montfaucon and at Thiaucourt in the Woevre. All territory over which our troops fought was examined by this service, and, generally speaking, the remains of our dead were assembled in American cemeteries and the graves marked with a cross or six-pointed star and photographed. A few bodies were buried where they fell or in neighboring French or British cemeteries. Wherever the soldier was buried, his identification tag, giving his name and Army serial number, was fastened to the marker. A careful record was kept of the location of each grave.

SIGNAL CORPS.

20. The Signal Corps supplied, installed, and operated the general service of telephone and telegraphic communications throughout the Zone of the Armies, and from there to the rear areas. At the front it handled radio, press, and intercept stations; provided a radio network in the Zone of Advance; and also managed the meteorological, pigeon, and general photographic services. Our communication system included a cable across the English Channel, the erection of 4,000 kilometers of telephone and telegraph lines on our own poles, and the successful operation of a system with 215,500 kilometers of lines.

MOTOR TRANSPORT CORPS.

21. The quantity and importance of gasoline-engine transportation in this war necessitated the creation of a new service known as the Motor Transport Corps. It was responsible for setting up motor vehicles received from America, their distribution, repair, and maintenance. Within the zone of the Services of Supply, the Motor Transport Corps controlled the use of motor vehicles, and it gave technical supervision to their operation in the Zone of the Armies. It was responsible for the training and instruction of chauffeurs and other technical personnel. Due to the shortage of shipments from America, a large number of trucks, automobiles, and spare parts had to be purchased in France.

RENTING, REQUISITION, AND CLAIMS SERVICE.

22. A Renting, Requisition, and Claims Service was organized in March, 1918, to procure billeting areas, supervise the quartering of

troops with an organization of zone and town majors, and to have charge of the renting, leasing, and requisitioning of all lands and buildings required by the American Expeditionary Forces. Under the provisions of an act of Congress, approved in April, 1918, the Claims Department was charged with the investigation, assessment, and settlement of all claims "of inhabitants of France or any other European country not an enemy or ally of an enemy" for injuries to persons or damages to property occasioned by our forces. The procedure followed was in accordance with the law and practice of the country in question. The efficient administration of this service had an excellent effect upon the people of the European countries concerned.

23. The various activities of the Services of Supply which, at its height on November 11, 1918, reached a numerical strength in personnel of 668,312, including 23,772 civilian employees, can best be summed up by quoting the telegram sent by me to Maj. Gen. James G. Harbord, the Commanding General, Services of Supply, upon my relinquishing personal command of the First Army:

"I want the S. O. S. to know how much the First Army appreciated the prompt response made to every demand for men, equipment, supplies, and transportation necessary to carry out the recent operations. Hearty congratulations. The S. O. S. shares the success with it."

MUNITIONS.

ORDNANCE.

24. Our entry into the war found us with few of the auxiliaries necessary for its conduct in the modern sense. The task of the Ordnance Department in supplying artillery was especially difficult. In order to meet our requirements as rapidly as possible, we accepted the offer of the French Government to supply us with the artillery equipment of 75's, 155 mm. howitzers and 155 G. P. F. guns from their own factories for 30 divisions. The wisdom of this course was fully demonstrated by the fact that, although we soon began the manufacture of these classes of guns at home, there were no guns of American manufacture of the calibres mentioned on our front at the date of the armistice. The only guns of these types produced at home which reached France before the cessation of hostilities were one hundred and nine 75 mm. guns. In addition, twenty-four 8-inch howitzers from the United States reached our front and were in use when the Armistice was signed. Eight 14-inch naval guns of American manufacture were set up on railroad mounts, and most of these were successfully employed on the Meuse-Argonne front under the efficient direction of Admiral Plunkett of the Navy.

AVIATION.

25. In aviation we were entirely dependent upon our Allies, and here again the French Government came to our aid until our own program could be set under way. From time to time we obtained from the French such planes for training personnel as they could provide. Without going into a complete discussion of aviation matériel, it will be sufficient to state that it was with great difficulty that we obtained equipment even for training. As for up-to-date combat planes, the development at home was slow, and we had to rely upon the French who provided us with a total of 2,676 pursuit, observation, and bombing machines. The first aeroplanes received from home arrived in May, and altogether we received 1,379 planes of the De Havilland type. The first American squadron completely equipped by American production, including aeroplanes, crossed the German lines on August 7, 1918. As to our aviators, many of whom trained with our Allies, it can be said that they had no superiors in daring and in fighting ability. During the battles of St. Mihiel and Meuse-Argonne our aviators excelled all others. They have left a record of courageous deeds that will ever remain a brilliant page in the annals of our Army.

TANKS.

26. In the matter of tanks, we were compelled to rely upon both the French and the English. Here, however, we were less fortunate for the reason that our Allies barely had sufficient tanks to meet their own requirements. While our Tank Corps had limited opportunity, its fine personnel responded gallantly on every possible occasion and showed courage of the highest order. We had one battalion of heavy tanks engaged on the English front. On our own front we had only the light tanks, and the number available to participate in the last great assault of November 1 was reduced to 16 as a result of the previous hard fighting in the Meuse-Argonne.

CHEMICAL WARFARE SERVICE.

27. The Chemical Warfare Service represented another entirely new departure in this war. It included many specialists from civil life. With personnel of a high order, it developed rapidly into one of our most efficient auxiliary services. While the early employment of gas was in the form of clouds launched from special projectors, its use later on in the war was virtually by means of gas shells fired by the light artillery. One of the most important duties of the Chemical Warfare Service was to insure the equipment of our troops with a safe and comfortable mask, and the instruction of the personnel in the use of this protector. Whether or

not gas will be employed in future wars is a matter of conjecture, but the effect is so deadly to the unprepared that we can never afford to neglect the question.

ADMINISTRATION.

MEDICAL AND SANITARY CONDITIONS.

28. The general health of our armies under conditions strange and adverse in many ways to our American experience and mode of life was marvelously good. The proportionate number of men incapacitated from other causes than battle casualties and injuries was low. Of all deaths in the American Expeditionary Forces (to September 1, 1919) totaling 81,141, there were killed in action, 35,556; died of wounds received in battle, 15,130; other wounds and injuries, 5,669; and died of disease, 24,786. Therefore, but little over two-sevenths the total loss of life in the American Expeditionary Forces was caused by disease.

Our armies suffered from the communicable diseases that usually affect troops. Only two diseases have caused temporarily excessive sick rates, epidemic diarrhea and influenza, and of these influenza only, due to the fatal complicating pneumonia, caused a serious rise in the death rate. Both prevailed in the armies of our Allies and enemies and in the civilian population of Europe.

Venereal disease has been with us always, but the control was successful to a degree never before attained in our armies, or in any other army. It has been truly remarkable when the environment in which our men lived is appreciated. The incidence of venereal disease varied between 30 and 60 per thousand per annum, averaging under 40. Up to September, 1919, all troops sent home were free from venereal disease. The low percentage was due largely to the fine character of men composing our armies.

29. Hospitalization represented one of the largest and most difficult of the medical problems in the American Expeditionary Forces. That the needs were always met and that there was always a surplus of several thousand beds, were the results of great effort and the use of all possible expedients to make the utmost of resources available. The maximum number of patients in hospital on any one day was 193,026, on November 12, 1918.

Evacuation of the sick and wounded was another difficult problem, especially during the battle periods. The total number of men evacuated in the Zone of the Armies was 214,467, of whom 11,281 were sent in hospital trains to base ports. The number of sick and wounded sent to the United States up to November 11, 1918, was 14,000. Since the Armistice, 103,028 patients have been sent to the United States.

30. The Army and the Medical Department were fortunate in obtaining the services of leading physicians, surgeons, and specialists in all branches of medicine from all parts of the United States, who brought the most skillful talent of the world to the relief of our sick and wounded. The Army Nurse Corps deserves more than passing comment. These women, working tirelessly and devotedly, shared the burden of the day to the fullest extent with the men, many of them submitting to all the dangers of the battle front.

RECORDS, PERSONNEL, AND MAIL SERVICE.

31. New problems confronted the Adjutant General's Department in France. Our great distance from home necessitated records, data, and executive machinery to represent the War Department as well as our forces in France. Unusually close attention was paid to individual records. Never before have accuracy and completeness of reports been so strictly insisted upon. Expedients had to be adopted whereby the above requirements could be met without increasing the record and correspondence work of combat units. The organization had to be elastic to meet the demands of any force maintained in Europe.

A Statistical Division was organized to collect data regarding the special qualifications of all officers and to keep an up-to-date record of the location, duties, health, and status of every officer and soldier, nurse, field clerk, and civilian employee, as well as the location and strength of organizations. The Central Records Office at Bourges received reports from the battle front, evacuation and base hospitals, convalescent-leave areas, reclassification camps, and base ports, and prepared for transmission to the War Department reports of individual casualties. Each of the 299,599 casualties was considered as an individual case. A thorough investigation of the men classed as "missing in action" reduced the number from 14,000 at the signing of the Armistice to 22 on August 31, 1919.

32. In addition to printing and distributing all orders from General Headquarters, the Adjutant General's Department had charge of the delivery and collection of official mail and finally of all mail. The Motor Dispatch Service operated 20 courier routes, over 2,300 miles of road, for the quick dispatch and delivery of official communications. After July 1, 1918, the Military Postal Express Service was organized to handle all mail, official and personal, and operated 169 fixed and mobile post offices and a railway post-office service.

While every effort was exerted to maintain a satisfactory mail service, frequent transfers of individuals, especially during the hurried skeletonizing of certain combat divisions, numerous errors in

addresses, hasty handling, and readdressing of mail by regimental and company clerks in the Zone of Operations, and other conditions incident to the continuous movement of troops in battle, made the distribution of mail an exceedingly difficult problem. -

INSPECTION—DISCIPLINE.

33. The Inspector General's Department, acting as an independent agency not responsible for the matters under its observation, made inspections and special investigations for the purpose of keeping commanders informed of local conditions. The inspectors worked unceasingly to determine the manner in which orders were being carried out, in an effort to perfect discipline and team play.

The earnest belief of every member of the Expeditionary Forces in the justice of our cause was productive of a form of self-imposed discipline among our soldiers which must be regarded as an unusual development of this war, a fact which materially aided us to organize and employ in an incredibly short space of time the extraordinary fighting machine developed in France.

Our troops generally were strongly imbued with an offensive spirit essential to success. The veteran divisions had acquired not only this spirit, but the other elements of fine discipline. In highly trained divisions, commanders of all grades operate according to a definite system calculated to concentrate their efforts where the enemy is weakest. Straggling is practically eliminated; the Infantry, skillful in fire action and the employment of cover, gains with a minimum of casualties; the battalion, with all of its accompanying weapons, works smoothly as a team in which the parts automatically assist each other; the Artillery gives the Infantry close and continuous support; and unforeseen situations are met by prompt and energetic action.

This war has only confirmed the lessons of the past. The less experienced divisions, while aggressive, were lacking in the ready skill of habit. They were capable of powerful blows, but their blows were apt to be awkward—teamwork was often not well understood. Flexible and resourceful divisions can not be created by a few maneuvers or by a few months' association of their elements. On the other hand, without the keen intelligence, the endurance, the willingness, and enthusiasm displayed in the training area, as well as on the battle field, the successful results we obtained so quickly would have been utterly impossible.

MILITARY JUSTICE.

34. The commanders of armies, corps, divisions, separate brigades, and certain territorial districts, were empowered to appoint general courts-martial. Each of these commanders had on his staff an officer

of the Judge Advocate General's Department, whose duty it was to render legal advice and to assist in the prompt trial and just punishment of those guilty of serious infractions of discipline.

Prior to the signing of the Armistice, serious breaches of discipline were rare, considering the number of troops. This was due to the high sense of duty of the soldiers and their appreciation of the seriousness of the situation. In the period of relaxation following the cessation of hostilities, infractions of discipline were naturally more numerous, but not even then was the number of trials as great in proportion to the strength of the force as is usual in our service.

35. It was early realized that many of the peace-time methods of punishment were not the best for existing conditions. In the early part of 1918, it was decided that the award of dishonorable discharge of soldiers convicted of an offense involving moral turpitude, would not be contemplated, except in the most serious cases. To remove these soldiers temporarily from their organizations, division commanders were authorized to form provisional temporary detachments to which such soldiers could be attached. These detachments were retained with their battalions so that offenders would not escape the dangers and hardships to which their comrades were subjected. Wherever their battalion was engaged, whether in front-line trenches or in back areas, these men were required to perform hard labor. Only in emergency were they permitted to engage in combat. Soldiers in these disciplinary battalions were made to understand that if they acquitted themselves well, they would be restored to full duty with their organizations.

All officers exercising disciplinary powers were imbued with the purpose of these instructions and carried them into effect. So that nearly all men convicted of military offenses in combat divisions remained with their organizations and continued to perform their duty as soldiers. Many redeemed themselves by rendering valiant service in action and were released from the further operation of their sentences.

36. To have the necessary deterrent effect upon the whole unit, courts-martial for serious offenses usually imposed sentences considerably heavier than would have been awarded in peace times. Except where the offender earned remission at the front, these sentences stood during hostilities. At the signing of the Armistice, steps were at once taken to reduce outstanding sentences to the standards of peace time.

PROVOST MARSHAL GENERAL'S DEPARTMENT.

37. On July 20, 1917, a Provost Marshal General was appointed with station in Paris, and later the department was organized as an administrative service with the Provost Marshal General func-

tioning under the First Section, General Staff. The Department was developed into four main sections—the Military Police Corps which served with divisions, corps, and armies and in the sections of the Services of Supply; the Prisoner of War Escort Companies; the Criminal Investigation Department; and the Circulation Department. It was not until 1918 that the last-mentioned department became well trained and efficient. On October 15, 1918, the strength of the Corps was increased to 1 per cent of the strength of the American Expeditionary Forces, and provost marshals for armies, corps, and divisions were provided.

The military police of the American Expeditionary Forces developed into one of the most striking bodies of men in Europe. Wherever the American soldier went, there our military police were on duty. They controlled traffic in the battle zone, in all villages occupied by American troops, and in many cities through which our traffic flowed; they maintained order, so far as the American soldiers were concerned, throughout France and in portions of England, Italy, Belgium, and occupied Germany. Their smart appearance and military bearing and the intelligent manner in which they discharged their duties left an excellent impression of the typical American on all with whom they came in contact.

PART IV.

MISCELLANEOUS SUBJECTS.

PRISONERS OF WAR.

1. All prisoners taken by the American troops were kept at least 30 kilometers behind our lines under guard by the Provost Marshal General's Department, except wounded or sick prisoners who were immediately sent to hospitals for treatment. Arrangements were made with the French and British that prisoners taken by our units operating with them should be sent to American enclosures. The Provost Marshal General was instructed to follow the principles of The Hague and the Geneva conventions in the treatment of prisoners, although these were not recognized by the United States as binding in the present war. Prisoners were organized into labor companies, and were employed on work which had no distinct bearing on military operations. The officer prisoners of war were accorded the same treatment as received by American officers confined in Germany. A Prisoner of War Information Bureau was established in the Central Records Office. Under a mutual understanding with the German Government, payments were made to prisoners in the form of credits, and, subject to censorship, they were allowed to send and receive letters and packages. Religious meetings were held by prisoner chaplains, assisted by our Army chaplains and welfare workers.

2. From June, 1918, to the end of March, 1919, a total of 48,280 enemy prisoners were handled by the Provost Marshal General's Department, of whom 93 died and 73 escaped and were not recaptured. At the request of the French Government, 516 prisoners, natives of Alsace-Lorraine, were released after examination by a French commission. In accordance with the provisions of the Geneva convention, 59 medical officers and 1,783 men of the sanitary personnel, including 333 members of the German Red Cross, were repatriated. On April 9, 1919, we commenced to repatriate enemy prisoners who were permanently unfit for further military duty and those who could not perform useful labor.

3. Through the Berlin Red Cross and the International Red Cross at Geneva, an American Red Cross committee at Berne received lists of all American prisoners taken by the German troops, to each of whom, when located, was sent a package containing food, tobacco,

clean underclothing and toilet articles, and thereafter two packages a week. By a system of return post cards, it was determined that 85 per cent of these packages were received.

As soon as the Armistice was signed the Germans released large numbers of Allied prisoners who immediately started toward the Allied lines. Four American regional replacement departments were established, to which all returning Americans were sent until proper records could be made. Those in good physical condition were sent to their commands, while the others were sent to hospitals or to leave areas for a rest.

An Allied commission was formed in Berlin early in December, 1918, for the repatriation of Allied prisoners, with representatives from each of the American, British, French, and Italian Armies. American prisoners were evacuated through Switzerland in fully equipped trains, including hospital cars, provided by the Swiss Government and paid for by our Government. These were met by American trains at the Swiss border. It was planned to withdraw all our prisoners by this route, but a number had already been withdrawn through the northern ports and taken to England in British ships.

The Allied Commission obtained a statement of moneys paid Americans while in German prisons; investigated complaints concerning treatment of Americans; obtained possession of effects of prisoners who had died in captivity, or which had been left behind by those repatriated; and also located the graves of the American dead.

4. On November 11, 1918, there were 248 American officers and 3,302 men in the hands of the Germans, all of whom were evacuated by February 5, 1919. None of our prisoners were condemned to death, although 1 officer and 20 men died in captivity.

5. An Inter-Allied agreement on January 13, 1919, created a commission for the control of Russian prisoners in Germany. The British and American representatives, aided by small unarmed detachments, were charged with the administration of the Russian prison camps, and succeeded in discharging their duties despite the civil disorders in Germany.

Early in January, 1919, the Red Cross outlined a plan to send a commission to Germany to assist in caring for and feeding Russian prisoners, and an American officer was detailed to assist and accompany this commission. The Red Cross being financially unable to furnish the necessary food, arrangements were finally made with the French Government to furnish funds for its purchase from our Army stores, without any responsibility being assumed by the Army, as was desired by the Allied Food Commission. Such supplies as could be spared by the Army were sold to the French, and American officers were detailed to assist in their distribution. On April 10, 1919, the Supreme Allied War Council decided to give the German

Government complete freedom in repatriating Russian prisoners of war, stipulating only that none should be repatriated by force, and that all who left must be provided with sufficient food for the journey.

CIVIL ADMINISTRATION OF OCCUPIED TERRITORY.

6. To insure law and order, it was necessary that an American civil administration be created in the occupied territory. Different policies were adopted toward Luxemburg and occupied Germany, the former being a disarmed neutral and the latter occupied enemy territory. In both regions we issued proclamations defining our attitude toward the inhabitants.

In accordance with the precedent of our Government under similar circumstances, the local civil government remained in full possession of its former power, and retained jurisdiction over all civil matters. The organization of our civil administration in occupied territory provided for the control of civil affairs by the Officer in Charge of Civil Affairs in Occupied Territory, under whom Army, corps, and division commanders detailed suitable officers in local charge of civil matters. In the Grand Duchy of Luxemburg, civil affairs were regulated by a corresponding representative with an office in the city of Luxemburg.

7. The principle of requisitioning supplies was exercised extensively throughout the area, always under central control and without abuse of the privilege. Under a board of appraisal payment was made for all property requisitioned, the money being obtained from the German Government under the terms of the Armistice. Food and forage were not requisitioned, and during most of the period of occupation our officers and men were not allowed to purchase any German food and were forbidden to eat in the restaurants and cafés.

In Luxemburg, billeting arrangements and payment therefor were provided for by an agreement with the Government of Luxemburg.

Under instructions from the State Department, the interests of American citizens found in occupied Germany were referred to the American Embassy in Paris; in Luxemburg to the American Legation at The Hague.

8. We insisted upon the Germans maintaining all public utilities. After being inspected, measures were taken to assure priority of fuel supply in case of coal shortage due to strikes in the Ruhr and Saar districts or other causes. One of our chief problems was the maintenance and repair of roads and highways, and this at first necessitated the employment of soldier labor. As soon as possible a satisfactory system of road preservation and improvement was inaugurated, utilizing German civil labor.

To control and supervise the movement of funds and securities, all banks and banking houses were required to submit monthly reports. Trade and blockade regulations were controlled through the American Section of the Inter-Allied Economic Committee.

9. The Civil Administration issued instructions relative to courts. Army, corps, and divisional commanders were authorized to convene military commissions and appoint superior provost courts for their respective districts; and commanding officers of each city, town or canton, appointed an inferior provost court. All of these courts were for the trial of offenses against the laws of war or the Military Government. Our legal machinery was simple, and successful results in maintaining law and order were due to uniform and strict enforcement of such few regulations as proved necessary.

Strict censorship was maintained over postal, telephone and telegraphic communications. Passes and circulation were first handled by the Department of Civil Affairs, but on January 24, 1919, the Third Army took charge of those matters.

In connection with the reconstruction work in France and Belgium, the Department of Civil Affairs prepared a record of all recovered stolen property and measures were taken to protect it against deterioration or unauthorized removal.

10. The fraternization problem was sharply raised by the sudden transition from the rigors of war conditions in France to the comforts of undisturbed German cities and homes, but a realization by our troops of their position in enemy territory and of their duty to maintain the dignity of their own country reduced infractions of rules on the subject to a minimum.

EXECUTION OF ARMISTICE TERMS.

11. The first Armistice agreement provided for supervision by a Permanent International Armistice Commission to function under the authority of the Commander-in-Chief of the Allied Armies. The United States, Great Britain, Belgium, France, Italy and Germany were represented on the Permanent International Armistice Commission. The chairmen of this commission and of the five main committees were French. These committees were organized to care specifically for the work in connection with material, transportation, prisoners of war, entretien, and restitution. The United States was represented on each of these main committees.

12. The Germans unsuccessfully attempted to enter the Permanent International Armistice Commission on the basis of negotiation. Many adjustments were made because of the difficulties under which the German authorities were working, but, in general, they were held strictly to the spirit of the terms of the Armistice agreement.

Time of delivery was often extended, but penalties were imposed for failure to comply with the conditions. All aeroplanes were not obtained until a penalty was imposed of 20 horses for each undelivered plane. Evacuation of occupied territory, and repatriation of civilian inhabitants and of prisoners of war, were begun immediately and carried out promptly.

13. In the distribution among the Allied Armies of ordnance and aeroplanes surrendered by the enemy, the Belgian Army received one-tenth, American Army two-tenths, British Army three-tenths, and French Army four-tenths. Our share was 720 field guns, 534 heavy guns, 589 trench mortars, 10,356 machine guns and 340 aeroplanes. Railway rolling stock was divided according to the needs of the railway systems serving the different armies.

14. The question of expense of maintenance of the armies of occupation caused considerable discussion among the Allies and protests from the Germans. This was due to the diversity of opinion as to the items properly chargeable to the expense of an army of occupation. My policy was that, pending final settlement by the Peace Conference, Germany would be liable for all expenses of the American Army of Occupation; that any payments made by Germany for this purpose were to be considered as partial payments on account of the whole sum, and not as a liquidation of any specific expenses. Money was deposited in Coblenz banks to the credit of the United States, in amounts notified as necessary, to cover all expenditures made in the occupied area. The total expense as calculated by the different Allied Armies, before any of our troops were withdrawn, was based on the effective strength as shown by their Tables of Organization, and appears as follows:

Armies.	Officers.	Men.	Horses.	Cost per month in francs.
French.....	11,570	35,500	116,100	175,948,815.00
Belgian.....	1,834	39,430	11,600	30,195,142.60
British.....	12,000	240,000	70,000	127,935,000.00
United States.....	12,358	275,617	58,755	269,068,184.10
Total.....				603,147,141.70

UNITED STATES LIQUIDATION COMMISSION.

15. In February, 1919, upon my recommendation, the Secretary of War appointed the United States Liquidation Commission, War Department, which had charge of the liquidation of our affairs in France, the sale of our property and installations and the settlement of claims exclusive of those arising out of torts, which were handled by the Renting, Requisition and Claims Service. While not under my supervision, the Liquidation Commission played such an

important part in the closing chapter of our activities that some mention of it should be made in this report. With the dissolution of the American Expeditionary Forces we were confronted with the problem of disposing of large port and other installations and immense quantities of transportation, matériel, supplies and equipment. Much of this was of an immovable nature and the shipping situation forbade the transfer to the United States of most of the movable effects. There was little or no demand for many of the articles to be disposed of, and the expense of maintaining a force of caretakers until the market improved would have been prohibitive. The successful negotiations of the Commission led to the liquidation of our affairs with France by the payment of a lump sum to the United States by the French Government.

RELATIONS WITH THE ALLIES.

16. Our troops arrived in Europe after France and Great Britain had been fighting desperately for nearly three years, and their reception was remarkable in its cordiality. The resources of our Allies in men and material had been taxed to the limit, but they always stood ready to furnish us with needed supplies, equipment and transportation when at all available. We were given valuable assistance and cooperation in our training program by both the French and British armies, and when the shortage of labor personnel in our forces became acute the French Government rendered material assistance in the solution of this problem.

It was our good fortune to have a year in France to organize and train our forces. When our troops entered the battle the veteran soldiers of France and England gave them moral and physical support. The Artillery of our Allies often supported the advance of American troops; British and French tanks frequently cooperated with our Infantry; and their aviators fought in the air to assist the American soldier.

Throughout France our troops have been intimately associated with the French people, particularly the French peasant, and the relations growing out of these associations assure a permanent friendship between the two peoples. The small force of Americans serving in Italy was accorded a warm welcome and established with the Italian people the most friendly relations. The hospitable reception of those of our forces who passed through England has impressed upon us how closely common language and blood have brought together the British and ourselves.

The cooperation of our soldiers with the French, British, Belgians and Italians was decisive in bringing the war to a successful conclusion, and will have an equally decisive effect in welding to-

gether the bonds of sympathy and good will among the peoples of these nations and ourselves.

WELFARE WORK.

ALLIED FOOD COMMISSION.

17. At the request of the Allied Food Commission a selected personnel of 320 officers and 464 men was placed at the disposal of the Commission. There was no other American personnel in Europe or elsewhere available for this necessary work. Our officers were sent to various countries in charge of food distribution, and were everywhere received with the utmost friendliness. These officers and men, by their executive and administrative ability and their energetic resourcefulness, were in a large measure responsible for the manner in which these food supplies were delivered to the various peoples in central Europe during a period of civil unrest or complete disorder. By their disinterested conduct of this charitable work, they won for the American Army the admiration of the populations whom they served.

SOCIETIES.

18. In their respective spheres of activity the Red Cross and Y. M. C. A. undertook the burden of supplying the needs of the entire American Expeditionary Forces. Their efforts were in many respects limited by a lack of tonnage. But shortage in tonnage, transportation, or personnel, meant inability to carry out completely their appointed tasks; whereas with the smaller societies it meant inability to expand. In order to avoid duplication of effort, it was directed in August, 1917, that the Red Cross confine its activities to relief work, and the Y. M. C. A. to amusement and recreation. The Knights of Columbus and the Salvation Army were later given official recognition. The Y. W. C. A., Jewish Welfare Board and American Library Association conducted their activities through one of the established societies.

19. The American Red Cross maintained within our zones a system of "Line of Communication Canteens," which furnished refreshments and relief to troops in transit and became a valuable feature of the Red Cross work. The statistical work of the searchers attached to statistical sections and to hospitals obtained much information for relatives. This society also aided in locating American prisoners to whom it sent food from Switzerland.

20. To avoid depleting our personnel, the Y. M. C. A. agreed to operate our canteens and was at first allotted 208 ship-tons per 25,000 men per month to bring supplies from the United States, but the requirements of other services later made it necessary to reduce

this allotment to 100 tons. This materially reduced the valuable service the Y. M. C. A. might have rendered in this work. The termination of hostilities made it possible to relieve the society of this responsibility.

21. The need of greatly expanded welfare work after hostilities, such as athletics and education was at once recognized, and the co-operation of the welfare societies in all these activities was of inestimable value. Immediately after the Armistice steps were taken to provide diversion and entertainment for our troops. Entertainment officers were appointed in all units, and the Y. M. C. A. Entertainment Department furnished professionals and acted as a training and booking agency for soldier talent. Approximately 650 "soldier shows" were developed, which entertained hundreds of thousands of soldiers, who will remember this as one of the pleasant and unique enterprises of the American Expeditionary Forces.

The athletic program in the spring of 1919 culminated in the Inter-Allied games in June, held in the concrete stadium erected by our Engineers near Paris, the necessary funds being contributed by the Y. M. C. A. In number of participants and quality of entry, these games probably surpassed any of the past Olympic contests.

LEAVES AND LEAVE AREAS.

22. A leave system announced in general orders provided for a leave of seven days every four months, but it was necessary to suspend the privilege during active operations. In the leave-areas free board and lodging at first-class hotels were provided for soldiers, and the Y. M. C. A. furnished recreational and amusement facilities. A number of new areas were opened by the Services of Supply immediately after the Armistice, improved transportation accommodations were eventually secured, and arrangements were made whereby men could visit England, Belgium and Italy.

It was my desire that every man in the American Expeditionary Forces should be given an opportunity to visit Paris before returning to the United States, but the crowded condition of the city during the Peace Conference, transportation difficulties, and other reasons, made it necessary to limit the number of such leaves.

RELIGIOUS WORK.

23. Religious work in our Army before the war was carried on by chaplains, one to each regiment. To meet the greatly increased size of regiments, legislation was recommended by me to provide not less than one chaplain for each 1,200 men. Although such act was passed in June, 1918, there was a continuous shortage of chaplains with the fighting units and in the hospitals and camps in the rear areas.

This was largely met through the ready cooperation of the Welfare Societies who sent ministers and priests where most needed. Religious workers in the Y. M. C. A. and Knights of Columbus and Red Cross also aided in the work, the Red Cross sending chaplains to the States with units in many instances.

The religious work was directed and coordinated by a Board of Chaplains at general headquarters, of which Bishop Charles H. Brent was the head. With great devotion to duty this work was maintained despite a lack of transportation and other facilities. Chaplains, as never before, became the moral and spiritual leaders of their organizations, and established a high standard of active usefulness in religious work that made for patriotism, discipline and unselfish devotion to duty.

EDUCATIONAL WORK.

24. Prior to the Armistice, educational work was conducted through the organization of voluntary classes under the Y. M. C. A., the popular subjects studied being French language, French history, and the causes of the war. After the Armistice, measures were taken for a systematic organization of non-military educational training.

The formal school work began January 2nd, with post schools. Then divisional educational centers gave the equivalent of high-school instruction and specialized on vocational training. The American Expeditionary Forces University at Beaune carried on undergraduate and graduate work for the technical professions, while postgraduate work was provided by the entrance of our officers and soldiers into French and British universities. Special schools were organized to meet demands, such as the Practical Agricultural School at Allery and the Art Training Center at Paris, for painting, sculpture, architecture and interior decoration, advanced students being entered in the best ateliers of Paris. Active instruction was carried on in the base hospitals and convalescent camps.

An important branch of the educational work was the field institute of short courses and educational extension lectures, organized to meet conditions due to the rapid repatriation of our soldiers and the constant movement of troops. At least half of our forces were reached by this means with brief intensive courses in business, trades, engineering, agriculture, occupational guidance, and in citizenship.

25. On April 15 all educational work came under the complete control of the Training Section of the General Staff. The advantage of this change in management was at once apparent in the better coordination of the work of an excellent body of educators. The total attendance in the organized school system of the American Expeditionary Forces was 230,020, of which number 181,475 attended post schools, 27,250 educational centers, 8,528 the American

Expeditionary Forces University at Beaune, 367 Art Training Centers, 4,144 Mechanical Trade Schools, 6,300 French universities and 1,956 British universities. The attendance upon the institute short courses totaled 690,000 more, and at the extension lectures 750,000, giving a grand total of attendance at all educational formations of 1,670,020.

The educational work in the American Expeditionary Forces was of undoubted value, not only in improving morale, but in concrete benefit to the individual officer and soldier. It demonstrated satisfactorily that a combined military and educational program can be carried out in the Army with little detriment to pure military training and with decided advantage to the individual.

STARS AND STRIPES.

26. The Stars and Stripes was a weekly newspaper conceived with the idea of increasing the morale of American troops by providing a common means of voicing the thought of the entire American Expeditionary Forces. Edited and managed by enlisted men who declined promotion, preferring to remain in the ranks in order better to interpret the spirit of the Army, it was a great unifying force and materially aided in the development of an esprit de corps. It lent loyal and enthusiastic support to Army athletics and to the educational program. In leading the men of our Army to laugh at their hardships, it was a distinct force for good and helped to create a healthy viewpoint. The campaign it conducted for the benefit of French orphans resulted in a fund of 2,250,000 francs.

APPRECIATION.

27. In this brief summary of the achievements of the American Expeditionary Forces it would be impossible to cite in detail the splendid ability, loyalty and efficiency that characterized the service of both combatant and non-combatant individuals and organizations. The most striking quality of both officers and men was the resourceful energy and common sense employed, under all circumstances, in handling their problems.

The highest praise is due the commanders of armies, corps and divisions, and their subordinate leaders, who labored loyally and ably toward the accomplishment of our task, suppressing personal opinions and ambitions in the pursuit of the common aim; and to their staffs, who developed, with battle experience, into splendid teams without superiors in any army.

To my Chiefs of Staff, Maj. Gen. James G. Harbord, who was later placed in command of the Services of Supply, and Maj. Gen. James

W McAndrew, I am deeply indebted for highly efficient services in a post of great responsibility.

The important work of the staff at General Headquarters in organization and administration was characterized by exceptional ability and a fine spirit of cooperation. No chief ever had a more loyal and efficient body of assistants.

The officers and men of the Services of Supply fully realized the importance of their duties, and the operations of that vast business system were conducted in a manner which won for them the praise of all. They deserve their full share in the victory.

The American civilians in Europe, both in official and private life, were decidedly patriotic and loyal, and invariably lent encouragement and helpfulness to the armies abroad.

The various societies, especially their women, including those of the theatrical profession, and our Army nurses, played a most important part in brightening the lives of our troops and in giving aid and comfort to our sick and wounded.

The Navy in European waters, under command of Admiral Sims, at all times cordially aided the Army. To our sister service we owe the safe arrival of our armies and their supplies. It is most gratifying to record that there has never been such perfect understanding between these two branches of the service.

Our armies were conscious of the support and cooperation of all branches of the Government. Behind them stood the entire American people, whose ardent patriotism and sympathy inspired our troops with a deep sense of obligation, of loyalty, and of devotion to the country's cause never equaled in our history.

Finally, the memory of the unflinching fortitude and heroism of the soldiers of the line fills me with greatest admiration. To them I again pay the supreme tribute. Their devotion, their valor and their sacrifices will live forever in the hearts of their grateful countrymen.

In closing this report, Mr. Secretary, I desire to record my deep appreciation of the unqualified support accorded me throughout the war by the President and yourself. My task was simplified by your confidence and wise counsel. I am, Mr. Secretary,

Very respectfully,

JOHN J. PERSHING,
*General, Commander-in-Chief,
American Expeditionary Forces.*

ANNUAL REPORT OF CHIEF OF STAFF.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF STAFF,
Washington, June 30, 1919.

The SECRETARY OF WAR.

SIR: At the time of the preparation of my previous annual report existing conditions permitted only a very brief and general outline of the work of the General Staff during the period covered by that report.

The magnitude of the task performed by it, the diversity and the complexity of the problems involved and the nature of the difficulties that had to be overcome during the war, however, render it both desirable and necessary that a more detailed report as to some of the principal activities during this period be made, as time becomes available, in order that some of the more important lessons that have crystallized out of the experience of the war may be indicated.

MOBILIZATION OF ENTIRE NATION.

At the time the armistice with Germany was signed on November 11, 1918, the United States had sent across 3,000 miles of ocean more than 2,000,000 men and a vast quantity of supplies for their support and use. This American activity had been a positive factor in the concluding military actions of the war, culminating in the splendid drive through the Argonne Forest to Sedan.

Considering the distance over which the United States had to operate and the relatively short period of its participation in the war, the achievement is without parallel in the many great performances of the war. Moreover, the organization which made this achievement possible had been developed to such a point that the flow of men and supplies overseas in the ensuing six months would have been a still more impressive accomplishment.

These things were brought about only by the organization of the resources of the whole Nation for the carrying on of the war. This mobilization, not of a national Army merely, but of a whole Nation, was something which has not been seen in any former war. Germany first deliberately planned for war on such a scale and organized for this one purpose her whole national resources. It was necessary for France, England, and the United States to develop under the pressure of actual war conditions the machinery for such universal mobilization.

The declaration of war, on April 6, 1917, found the United States, from a military, industrial, and economic standpoint, thoroughly unprepared for the great task which confronted it.

In connection with the part played by the War Department in this task, I desire in this report to outline, in a general way, the evolution of the plans and the development of the organization of the General Staff, which, under the Chief of Staff, is charged by the Secretary of War with the planning, development, and execution of the military program. It will not deal with the subject of the manufacture of munitions, which will be covered by the detailed reports of the Director of Munitions and of the chiefs of the bureaus concerned, nor with the operations of the American Expeditionary Force in France, which will be covered by the report of Gen. Pershing.

ORIGINAL TENTATIVE ARMY PROGRAM.

In the consideration in the spring of 1917 of the military program to be adopted by this country, the amount of tonnage that would be available to transport and to maintain troops overseas was problematical in view of the submarine situation. The sinkings during the months of March, April, and May were very heavy and indicated the serious possibility that Germany's submarine campaign might so reduce ship tonnage that the Allies could not procure the necessary foodstuffs, metals, and supplies required for the successful prosecution of the war.

It was possible that only a comparatively small expeditionary force could be sent overseas, to increase the morale of the Allies and to decrease that of the Germans, reserving the greater part of the available tonnage to carry food and supplies to the Allies. It was, furthermore, considered by some, both in this country and abroad, that the United States would not be able to supply a large land Army and that, therefore, America's chief contribution should be a huge aerial force.

The tentative program adopted at that time accordingly contemplated:

(1) To send overseas promptly a small but complete body of American troops in the form of one tactical division for the purpose of serving as the nucleus for the organization and training of our overseas troops and for the resulting effect upon the morale of the Allies and of the Central Powers. It was essential, in order that the morale of the Germans might be lowered, that some American troops be put into the trenches at the earliest possible date.

(2) To follow this advance detachment by an expeditionary force of sufficient size, if the shipping situation permitted, to make American participation an effective factor in the prosecution of the war. The submarine situation and other conditions made it impracticable at this early date to determine the exact size of this expeditionary force, but in a general way it was contemplated that the capacity of the 16 National Army cantonments and the 16 National Guard camps which were under construction would enable approximately 1,000,000 men to be in France by the end of the year 1918.

(3) In May, 1917, when the plans and policies for our military effort were in a very formulative stage, the French authorities requested that the United States undertake a tremendous part in aerial warfare by sending 4,500 American aviators, and a correspondingly great amount of matériel to France within a year. In the Aviation Section of the Signal Corps there were approximately 35 officers who could fly elementary planes; there were no officers who had had training or experience with fighting ships. Furthermore, there were no fighting ships, no commercial industry for the production of the vast amount of aerial equipment required, and the aeronautical engineers in the country were negligible in number.

Urged by popular enthusiasm, the Aviation Section of the Signal Corps undertook an air program entirely disproportionate to a properly balanced Army and, as events showed, impossible of execution. The history of this transcendental program, which was adopted and undertaken by the Signal Corps practically independently of the rest of the Army, affords an early and a striking example of the necessity for a General Staff to formulate the military program and to coordinate the activities of the various agencies concerned. Such coordination was not, in the case of the air program, effected during the first year of the war.

THE 30-DIVISION PROGRAM OF OCTOBER 7, 1917.

The original tentative program crystallized into a definite plan when, in the early part of July, 1917, Gen. Pershing sent back to this country confidential preliminary recommendations covered by his "General Organization Project" of July 10, 1917. This contemplated the shipment overseas during 1917 and 1918 of an American Expeditionary Force of 30 divisions. Under date of September 18, 1917, Gen. Pershing submitted his "Service of the Rear Project" which was approved, and this was followed by his "Schedule of Priority Shipments" of October 7, which was likewise approved. This priority schedule, together with cabled requests received from time to time for special and additional troops, or embodying other minor modifications in the schedule, constituted the program by which priority of shipments overseas was established.

It was divided into six phases and provided for the placing in France by December 31, 1918 of 1,372,399 troops consisting of 30 divisions organized into 5 corps of 6 divisions (4 combat, 1 training, and 1 replacement) each, with the necessary corps troops, Army troops, service of supply troops, and replacements.

This program was the official approved military program when, on March 4, 1918, I assumed the duties of Acting Chief of Staff.

In the early part of 1918 the military situation was most critical. Due to the effectiveness of the steps taken by the British and the American Navies the submarine situation, while, of course, still a matter of great concern, was such as to make clear that the German unrestricted submarine warfare would fail to accomplish the results expected by its proponents, namely, to starve England out and to prevent to a large extent trans-Atlantic and cross-channel shipments of troops and supplies to France.

The situation on the land was, however, much more unfavorable to the Allies. Germany and her allies still maintained a numerical superiority on the western front, and this superiority was being increased daily by the transfer of troops who had been released, for service on the western front, as the result both of the elimination of Russia, during the winter, as an actual factor in the war, and of the defeat of the Italian army by the Austro-Germans in the fall. The German armies also possessed the advantages of shorter interior lines of communication, approximately three millions of Russian and other war prisoners who released soldiers for combatant duty, and trained senior and General Staff officers developed as the result of 40 years of preparation. Furthermore, they possessed the great advantages of unity of command, and of operating on the offensive in enemy territory.

While these advantages were exploited in every way possible in the German propaganda, it was known that the failure of the unrestricted submarine warfare to accomplish the promised results, the failure to capture the channel ports, and, in general the failure, notwithstanding the enormous losses, to terminate the war, were rapidly affecting the German morale. It was inevitable that the German high command would be forced to seek an early and decisive determination of the war by a military victory on the western front before the power of the United States could be developed sufficiently to become a decisive factor. England had reached the limit of her man power; France was exhausted; the necessity for their reinforcement, in the greatest numbers, and at the earliest moment possible was vital to the success of the allied cause.

When I returned to this country in March, 1918, it was with the firm conviction that it was imperative that the shipment of troops to France be vastly increased at the earliest practicable date, and have priority over everything else, and as this policy became effective studies were instituted as to the practicability of putting in France a sufficient number of men to bring the war to an early conclusion.

THE 80 DIVISION PROGRAM OF JULY 18, 1918.

After a study of the entire situation I came to the conclusion that the war might be brought to an end in 1919, provided we were able to land in France by June 30 of that year 80 American divisions of a strength of 3,360,000 men. On July 18, 1918, I submitted to you a formal memorandum, accompanied by a study of methods by which the men could be obtained, the supplies procured, and an analysis of the shipping which must be obtained in order to accomplish this very large military program. This was accompanied by an estimate of the cost of the proposed program.

In this study I recommended to you the adoption, as the American program, of 80 divisions in France and 18 at home by June 30, 1919, based on a total strength of the American Army of 4,850,000 men. This was approved by you and by the President of the United States and adopted as our formal military program.

The details of this program are shown in tabular form below:

Date.	During month ending on date indicated.				On date indicated.		
	Men to be drafted.	Movement overseas.			Total in American Expeditionary Forces.	Remain- ing in United States.	
		Reinforce- ment troops.	Replace- ment troops.	Total troops shipped.			
1918.							
Feb. 28.							
Mar. 31.							
Apr. 30.							
May 31.							
June 30.					1,000,000	1,450,000	2,500,000
July 31.	345,000	200,000	50,000	250,000	1,235,000	1,545,000	
Aug. 31.	250,000	200,000	50,000	250,000	1,470,000	1,545,000	
Sept. 30.	200,000	200,000	50,000	250,000	1,705,000	1,495,000	
Oct. 31.	155,000	200,000	50,000	250,000	1,945,000	1,400,000	
Nov. 30.	150,000	185,000	40,000	225,000	2,160,000	1,325,000	
Dec. 31.	150,000	175,000	25,000	200,000	2,350,000	1,275,000	3,675,000
1919.							
Jan. 31.	100,000	160,000	15,000	175,000	2,515,000	1,200,000	
Feb. 28.	200,000	160,000	15,000	175,000	2,675,000	1,225,000	
Mar. 31.	300,000	200,000	35,000	235,000	2,885,000	1,290,000	
Apr. 30.	300,000	175,000	75,000	250,000	3,060,000	1,340,000	
May 31.	300,000	100,000	100,000	250,000	3,210,000	1,390,000	
June 30.	300,000	100,000	100,000	250,000	3,360,000	1,440,000	4,850,000
	2,750,000	2,155,000	605,000	2,760,000	-----	-----	-----

NOTES.—(a) The actual wastage of replacements is assumed at 400,000. (b) Organization into divisions is as follows:

Date.	American Expeditionary Forces.	United States.	Total.
June 30, 1918.	24	18	42
Dec. 31, 1918.	52	18	70
June 30, 1919.	80	18	98

In view of the great length of time required to produce the supplies and equipment required for a possible continuation of this program studies were at once begun on an extension of this program through the year ending June 30, 1920. This extension, which was approved September 3, was given out to the supply departments for their use in preparing estimates. It provided for an Army of 4,260,000, or 100 divisions, in France, and 1,290,000, or 12 divisions, in the United States, or for a total of 5,500,000 men by June 30, 1920.

Up to the signing of the armistice troops were being transported to France in accordance with the program of July 18.

This program, which embodied a material increase in the previous official program (it contemplated 2,350,000 men in France by Dec. 31, 1918, as compared with 1,372,399 contemplated by the program of Oct. 7, 1917), required for its accomplishment a marked intensification of the efforts of all agencies of the War Department and a thorough and effective correlation of their activities.

Preliminary steps.—Reference will now be made to some of the steps which were regarded as necessary or desirable in this connection.

As stated in my previous report, shortly after I entered upon the duties of Chief of Staff I adopted the policy of interchanging the offi-

cers of the various staff corps in this country and abroad, and pursuant to this policy men were placed at the heads of various bureaus whose experience in France especially equipped them for the handling of the problems pertaining to their respective bureaus in accordance with the methods and principles evolved and practiced during the war.

With your approval I also adopted for the entire Army the principle of promotion by selection, which had already been found by the responsible authorities in France to be a necessary prerequisite to efficiency in the American Expeditionary Forces, and I abolished all distinctions between Regular Army, National Guard, and National Army organizations and personnel, which had previously existed, by consolidating the entire Army into one Army—the Army of the United States. The experience of the war has proved that these steps resulted in a degree of efficiency throughout the Army that would not otherwise have been possible of attainment.

Extension of draft ages.—The studies made in connection with the new program showed that to carry it into effect required the enactment by Congress of legislation extending the draft ages to include men between the ages of 18 and 45 years and would necessitate the creation of a deficit, over the enormous appropriations already made, of approximately \$7,000,000,000. The presentation of the program to Congress, accompanied by the statement that this increase in the Army, if legislation were enacted by Congress which would enable it to be effective, would lead to success in 1919, resulted in prompt and favorable action by that body.

Troop and cargo ships.—Perhaps no subject was the cause of more concern in the execution of the accelerated shipping program or in connection with the formulation of the military program than that of the procurement of the vast amount of ship tonnage, especially cargo carrying tonnage, required for this purpose.

At the outbreak of the war there was operating under the control of the War Department a total of seven transports. The beginning of the great transport fleet under American control which, on the signing of the armistice, aggregated over 600 vessels of a total tonnage of more than three and one-half million dead-weight tons was made when the interned German vessels which had been seized came into service in the fall of 1917 with a tonnage of over 450,000 dead-weight tons.

Subsequent material additions, which were available in connection with the enlarged shipping program which was put into effect after I became Chief of Staff, included the Dutch vessels, aggregating about 300,000 dead-weight tons which were taken over by the United States, and the three great British liners which were assigned to the service of the War Department, in the early months of 1918. A serious deficiency in cargo ships which had developed led to the organization, in February, 1918, of the Shipping Control Committee, which regulated the allocation and distribution of available tonnage, both American and British. Through the cooperation of this committee, and as the result of the urgent representations made to the Shipping Board relative to the necessity of withdrawing additional ships from trade and of the chartering of every available ship that could be secured from any allied or other country, it was practicable to em-

bark, during the months of May, June, July, and August, 1,121,000 men.

On July 9, 1918, there were 75 transports carrying 171,670 troops en route overseas from the United States. This was the greatest number of troops on the water between the United States and France at any one time during the eastward movement. The embarkation for July exceeded all expectations, 306,000 troops sailing from Atlantic ports.

The department was able to announce to the President and the American people on July 1 that between May 8, 1917, and June 30, 1918, over a million men had either been landed in France or were en route thereto, and by September 22 it was able to announce that a second million had been sent.

Of the 2,082,000 men who had been embarked when the armistice was signed, over a million and a half had been embarked during the last 6 of the 19 months of our participation in the war. Of this number American flag ships carried approximately 44 per cent, the British approximately 51 per cent, the Italians 3 per cent, and the French 2 per cent. It may be stated here that, in the execution of this program, ways were found to increase the normal loading of our own transports without disadvantageous results of any consequence, by almost 40 per cent, and that the American transports surpassed those of the Allies both in the extent to which they were loaded and in the speed of their turn around.

When German submarines appeared off the Atlantic coast with the obvious purpose of delaying our shipping program, pressure was brought to bear on the department, not only from within this country but from our Allies who were cooperating in furnishing the shipping, to modify the program by changing the embarkation points to Canada. Realizing that the German military authorities appreciated the inevitably decisive effect of the continuation of the shipping program and having entire confidence in the effectiveness of the measures adopted by the Navy to protect the convoys of our troops, I declined to accede to the suggestions that any steps be taken which would result in any retardation of our shipment of troops to France. It is of interest in this connection that no United States transport was sunk on an eastward voyage during the period referred to.

A serious difficulty in maintaining this program, by a singularly unfortunate combination of circumstances, was the outbreak at this same critical period of the influenza epidemic which became acute at the time the necessity for the uninterrupted shipment of troops to France was most pressing. Some of the best medical advice at the disposal of the department regarded it as necessary, and so recommended, that the carrying capacity be decreased as much as 40 per cent as a precaution to prevent the ravages of the epidemic. After a most careful consideration of all phases of the situation I declined to approve a decrease of more than 15 per cent in this capacity, believing that this was sufficient reduction to afford every safeguard that was warranted by the urgency of the military situation and that it would afford, in effect, every advantage that was practicable. Events showed this decision to be fully warranted, since the careful observations made at the time showed conclusively that, as a matter of fact, the percentage of deaths from the epidemic on troop trans-

ports, was actually less than in the camps and cantonments in this country.

The studies made in connection with the formulation of the 80 division program showed that while the troop transport fleet which, as the result of unremitting effort, had been developed by the summer of 1918, could, without great difficulty, be relied upon to meet the requirements of this program so far as the transportation of troops was concerned, a serious deficiency in cargo shipping existed which would require early and radical action. In view of the great demands for cargo tonnage that had already been made on the shipping of this and all other countries in the building up of our transport fleet, the provision of the large amount of additional tonnage required by this program was a difficult and intricate problem. The only possible sources were the United States and England. In July, 1918, the American tonnage not in the War Department service comprised about 550 ships of an aggregate tonnage of about two and one-half million dead-weight tons. The extent to which this tonnage could be withdrawn required very careful consideration especially in the case of that employed in the nitrate, manganese, chrome, sulphur, and New England coal trades. Furthermore, a great part of this tonnage was not suitable for trans-Atlantic service on account of the fact that the ships in question were not of sufficient size to do satisfactory work when bunkered for the round trip, as was necessary in view of the reduced production of coal in Great Britain. As a result of the urgent representations that were made to the Shipping Board and the Emergency Fleet Corporation, however, a program was adopted with which during the period from July to November, inclusive, a total additional tonnage of approximately 2,000,000 dead-weight tonnage was rendered available. This total included approximately 1,000,000 tons which was withdrawn from the trades. It also included approximately 718,000 tons of new vessels (as compared with the Emergency Fleet Corporation estimates of 1,775,699 tons).

After making full allowance for all tonnage that could possibly be supplied from American sources, however, the study showed that the enlarged program would require the provision of additional tonnage amounting to 1,200,000 tons from August, 1918, and reducing month by month to 200,000 tons in February, 1919, and then ending. The only possible source from which this great amount of tonnage could be supplied was England. She had been hardest hit by the submarine warfare and, furthermore, she was at the time already bending every effort to assist in increasing the movement of American troops to France.

The situation, however, required radical steps if the allied cause were to be saved, and in view of this fact the Secretary of War and the Chief of the Transportation Service (then Chief of Embarkation) appeared before the Allied Maritime Council in London on September 30, 1918, and presented the needs of the United States for additional cargo tonnage to carry through the increased military program. The amount of tonnage required would transport about 2,000,000 tons dead-weight of cargo, and its allocation to the supply program of the American Army would result in the accumulation of a deficit of that amount of food and essential commodities for

Great Britain and the Allies. Notwithstanding this fact, however, and relying entirely upon the assistance of the United States later as new tonnage became available, England agreed to allocate sufficient tonnage to meet the requirements of the American program subsequent to the date of this conference.

The signing of the armistice on November 11, 1918, left uncompleted the great cargo program. The 80-division program contemplated monthly shipments, increasing by July, 1919, to 1,759,750 short tons; in November, 1918, approximately 825,000 tons were shipped.

The deficiency in shipping rendered it imperative that every possible step be taken to secure the maximum degree of efficiency from the shipping available. Special attention in this connection was paid to plans for still further decreasing the time of turn around. The importance of this is indicated by the fact that a reduction of 10 days in the average turn around of the cargo transports would at this time have been equivalent to an increase in cargo tonnage of approximately 386,000 dead-weight tons. Another important factor in this matter was the action taken to prevent port congestion in France. This was effected in part by the provision of the enlarged terminal facilities at the ports of debarkation and in part by the provision of great quantities of railroad transportation for use in the prompt evacuation of supplies from the ports.

In connection with the formulation and execution of the enlarged program it was also necessary to give consideration to other matters of primary importance.

Defects of bureau system.—As the war progressed it became increasingly evident that the organization of the War Department as it existed at the beginning of the war was in many respects entirely inadequate to meet the requirements of the situation.

Under the system of separate and independent bureaus, as organized when we entered the war, a condition of affairs eventually and inevitably developed which threatened the very success of any extensive military program. Each bureau, absorbed in the tremendous expansion of its personnel and in its problems of supply, naturally concentrated every effort upon the development of a program which would meet every possible requirement that might be imposed upon that particular bureau without reference, in general, to the requirements either of other bureaus or services or of the Army program as a whole. With this independent and uncorrelated action of the different bureaus the defects of the existing bureau system soon became manifest. There developed a competition for manufactured articles and for raw materials and for labor which resulted in high prices and in an inefficient distribution of labor, involving a scarcity in certain localities and actual unemployment in others; similarly there resulted a congestion in the placing of contracts and in the location of new manufacturing plants in many localities, irrespective of the labor, fuel, power, and transportation available. Plants and real estate were commandeered or purchased by individual bureaus without consideration of the effect upon the requirements of other bureaus, and no standardized contract procedure obtained to protect either the manufacturers and owners or the United States. The total lack of standardized specifications re-

sulted in a delay in manufacture, a lack of interchangeability, and an increased cost. Nine independent and different systems for estimating requirements were in operation, with a consequent lack of balance in the military program and inefficient utilization of the available manufacturing plants. There were five different sources of supplies for organizations to be equipped and five different and complicated systems of property accountability for the officers charged with equipping these organizations. There were 10 different agencies for handling money accounts in the War Department, with at least 5 different systems of fiscal accounts, with no adequate supervision of expenditures.

There existed no agency within the War Department for determining questions of priority among the different bureaus for manufactured articles or for raw materials. Furthermore, there existed no agency for representing the War Department as a whole in its relations with the War Industries Board in connection with the determination of similar questions of priority between the War Department and the other departments and agencies of the Government, although the Army requirements exceeded all others combined; it was impossible for the War Industries Board, in allocating supplies, materials, and manufacturing capacity, to secure adequate information as to the needs of the War Department as a whole. Individual agreements were being made by various bureaus with foreign governments involving obligations as to replacements and deliveries, which were without reference to the military program as a whole or to the tonnage available, and which was impossible of fulfillment. Each bureau had a more or less decentralized system of storage and was proceeding independently with the construction or procurement of new, and in many cases excessive, storage facilities. Each had a different system of property accountability and no practicable means existed for determining accurately and quickly from the records in Washington the amounts of supplies actually available.

There existed no effective means of traffic control for regulating and establishing priorities among the different bureaus as to shipments to ports. The necessity for such a system was especially emphasized by the fact that the relative urgency for different classes of supplies overseas was, necessarily, as indicated by the shipping priority schedule received, subject to frequent and sudden changes as the character of the operations and requirements of our overseas forces changed from time to time. Thus at one time railroad and construction material was most urgently needed, while at other times aviation equipment, medical supplies, motor transportation, and horses and mules were each given priority. It was accordingly impracticable to allocate cargo tonnage to the various bureaus far in advance, and it was essential that a system of traffic control be established which would be responsive, with the minimum of delay, to the changing priority schedules.

The lack of an effective system of traffic control resulted in such a competition for transportation and in such a congestion of railroad equipment, required not only for the shipment of our own supplies but for the shipment of those of the Allies as well, as to result in rendering inoperative a large part of the available railroad equipment of the country. This congestion of railroad equipment was in

part contributory to the fuel shortage which at one time threatened seriously to interfere with the sailing of our transports. This lack of an effective system of traffic control also resulted in the filling of the storage facilities at the ports and piers with unessential materials and thereby prevented the shipment of essential materials and supplies. This is instanced by the fact that it became necessary for the authorities in France at one time to protest strongly against the fact that certain bureaus were shipping mahogany desks and other office furniture in space which was urgently needed for food, medical supplies, and ammunition. It was rapidly becoming impossible to load the transports in accordance with the American Expeditionary Forces requirements as shown by the shipping schedules or to furnish adequate shipping lists covering the supplies actually shipped. It was evident that if the storage facilities, the railroad equipment, and the ocean tonnage were to be utilized promptly and to utmost capacity and in accordance with the actual requirements overseas, it would be necessary for a central controlling agency to control every shipment of materials and supplies from its point of origin in the United States to its delivery to the base port in France—to release the shipment from the factory or storehouse, provide the necessary railroad transportation to the terminals at the port of embarkation, collect it at the piers, and load it on the transport, all in accordance with carefully prearranged plans which articulated closely with the plans for organizing, training, and equipping the Army.

It may be noted here that the problem of the shipment, in the great numbers required, of troops from every camp and cantonment to France was closely analogous to that of the shipment of supplies. It involved the same necessity for observing overseas priorities, the same dangers of congestion at the ports of embarkation and the same necessity for a continuous and direct traffic control from the point of origin to the transport.

In order that the War Department might meet the great task and responsibilities imposed upon it by the war it had, during the first year of the war, become increasingly evident that a reorganization was necessary which would provide for:

1. A redistribution of existing functions of various bureaus in such a manner as to consolidate important similar or identical functions in the one agency best adapted to handle them.

2. The creation of certain new agencies to handle matter previously handled by existing bureaus but not logically a part of their function, and the creation of certain new services found to be necessary as the result of the developments and experiences of the Army overseas.

3. The reorganization of the General Staff in such a manner as to enable it to perform its proper functions of an effective central controlling agency to coordinate and to control all existing War Department agencies and services so as to eliminate lost motion and to direct their activities in such a manner as to further to best advantage the development and the execution of the military program as a whole.

The necessity for action along these lines had been recognized by the department and steps had been taken providing for a reorganization of this character to such an extent as was authorized by existing legislation. It was not, however, until the passage by Congress of the Overman Act, which was approved by the President on May 20,

1918, that it was practicable for an adequate and efficient reorganization to be put into effect.

Reorganization of the General Staff.—One of the most important matters taken up by the department during the earlier part of the war was the reorganization of the General Staff. Prior to the act of February 14, 1903, the United States Army had no General Staff. Since the early history of the country there had been a Commanding General of the Army and a system of semi-independent War Department bureaus which was loosely coordinated either with the line of the Army or with one another. There had long been uncertainty and dispute as to the respective functions and authority of the Secretary of War, the Commanding General, and the bureaus. During the Civil War this War Department organization proved so inefficient that a committee of Congress sat almost continuously to investigate the conduct of the war. The failures of the bureau supply system during the brief War with Spain is a matter of general knowledge. When Mr. Root became Secretary of War on August 1, 1899, he became convinced that there was a fundamental organizational defect in the War Department bureau system as it had grown up through more than a century of history. He pointed out that this system had developed in such a way as largely to tie the hands of the Secretary of War himself and to make it impossible for him to supervise and direct in any effective way the work of his department. After an exhaustive study of the matter he recommended to Congress, and succeeded in securing the enactment of, the organic act of February 14, 1903, which abolished the office of Commanding General of the Army and created a General Staff Corps of 45 officers, having at its head a Chief of Staff, who under the direction of the President and the Secretary of War was charged with the supervision of all troops of the line and of all War Department bureaus.

However, by the act of August 23, 1912, Congress reduced the strength of the General Staff to 36. The national-defense act of June 3, 1916, increased the strength of the General Staff Corps to a maximum of 55, exclusive of the Chief of the Militia Bureau and of the Chief of Coast Artillery, this maximum to be attained, by five annual increments, by 1920. This act, however, in effect still further decreased the strength of the General Staff Corps by providing that "not more than one-half of all the officers detailed in said corps shall at any time be stationed, or assigned to, or employed upon any duty in or near the District of Columbia." It also prohibited the Chief of Staff from attaching to his office for more than 30 days at a time any officers not members of the General Staff Corps.

On April 6, 1917, the date of the declaration of war, the General Staff, which was organized under the provisions of the act of June 3, 1916, had an authorized strength of 41 officers, the first annual increment only having been added. Under the limitations imposed by this act, the General Staff, on the date referred to, consisted of 19 officers stationed in Washington and 22 stationed elsewhere. The task of preparing the plans for creating, mobilizing, organizing, training, equipping, transporting to Europe, and of maintaining and supplying there the future Army of the United States accordingly devolved upon a group of 19 officers, who constituted the Gen-

eral Staff, authorized by law to be stationed in the city of Washington. This personnel was, of course, ridiculously inadequate, not only for the gigantic task confronting it, but for any General Staff work commensurate with the responsibilities of that corps. It is of interest in this connection to note that at the beginning of the war the strengths of the general staffs of Germany, France, and England were, respectively, approximately 650, 644, and 232.

The low ebb to which the General Staff had been brought at the time of the beginning of the war by restrictive legislation is indicated by the fact that on the signing of the armistice of the 1,072 officers on duty on or with the War Department General Staff but 4 had had previous General Staff experience; these 4 were general officers.

The act of May 12, 1917, increased the General Staff to 91 and removed, for the period of the emergency only, the restrictions of the act of June 3, 1916, relative to the number of these officers authorized to be stationed in Washington. This act was followed by the act of May 18, 1917, which authorized the President "to provide the necessary officers, line and staff," for the forces raised under this act, and removed, for the period of the emergency, the legislative restrictions as to the strength and organization of the General Staff Corps.

On June 30, 1919, the strength of the General Staff Corps was 253, including 130 detailed under the act of May 18, 1917, for the period of the emergency. There were at this time 395 officers detailed for duty with the General Staff, a reduction of 549 since the signing of the armistice.

The evolution and development of the present organization of the different divisions of the General Staff, from the nucleus of 11 officers on duty with the War College Division on the outbreak of the war, is outlined elsewhere in this report in connection with the account of the work of the individual divisions.

The first steps taken to organize the General Staff in such a manner as to enable it to perform its proper function of effecting the coordination of the activities of the various War Department agencies, which was recognized as being necessary to the successful accomplishment of the military program, was the issue on February 9, 1918, of General Order No. 14. This order organized the General Staff into five main divisions, namely, the Executive, the War Plans, the Purchase and Supply, the Storage and Traffic, and the Operations Divisions. It charged the Chief of Staff with "the planning and development of the Army program," and it provided that the chief of the Purchase and Supply Division should "have cognizance and supervision of the purchase and production of all munitions and other supplies" and should be charged with "the supervision and direction of all purchases, procurement and production activities of the several bureaus, corps, and other agencies of the War Department."

The General Staff was organized under this order on March 4, 1918, when I became Acting Chief of Staff.

The congestion at the ports had, however, become so acute by that time that unless adequate corrective measures had been taken without delay the movement of supplies overseas, both for this country and for the Allies, would undoubtedly within a few months have

been practically blocked. Experience had shown that the interior organization of the various bureaus was such as to render an effective supervision of their activities by the General Staff, as contemplated by General Orders, No. 14, impossible. As the result of a careful consideration of the matter I became convinced that a consolidation of procurement, except of certain specialized equipment, of storage, of finance, and of transportation, together with a positive and direct central control of these activities by the General Staff, was essential to the elimination of the unsatisfactory conditions existing and to the rapid, efficient, and economical utilization of the resources of the country to the development of the Army program as a whole. The magnitude of the task, the diversity of conflicting interests, and the intimate correlation required by the different agencies involved permitted no division of responsibility or of effort if the War Department machine was to function with that degree of efficiency which was essential if the urgent and constantly changing needs of our Army were to be met.

On August 26, 1918, with your approval, General Orders, No. 80, was issued. This order provided:

The Chief of the General Staff is the immediate adviser of the Secretary of War on all matters relating to the Military Establishment, and is charged by the Secretary of War with the planning, development, and execution of the Army program. The Chief of Staff by law (act of May 12, 1917) takes rank and precedence over all officers of the Army, and by virtue of that position and by authority of and in the name of the Secretary of War he issues such orders as will insure that the policies of the War Department are harmoniously executed by the several corps, bureaus, and other agencies of the Military Establishment and that the Army program is carried out speedily and efficiently.

This order definitely charged the Chief of Staff with the responsibility for the execution of the Army program and delegated to him the authority commensurate with this responsibility.

It further consolidated the previously existing Purchase and Supply Division and the Storage and Traffic Division into the Purchase, Storage and Traffic Division, under the Director of Purchase, Storage and Traffic, who was specifically charged with the "control of the * * * procurement and productive activities, including real estate, of the several bureaus, corps, and other agencies of the War Department, * * * the storing and warehousing of property for all departments, bureaus, and corps of the Army, * * * the movement of all property of the War Department, * * * and the transportation of troops and supplies overseas * * *."

Under the general authority contained in the Overman Act, which had been approved May 20, the Director of Purchase, Storage and Traffic was immediately upon the issue of General Orders, No. 80, authorized by me to effect a consolidation of the procurement (except in the case of the procurement of certain technical or specialized equipment pertaining to the technical corps) and of the storage functions of the various bureaus and services. The details of the procedure followed in this connection are given elsewhere in this report. In effect the result was to transfer these functions to the Quartermaster Department, already handling about 80 per cent of the procurement and storage activities of the Army, the Quartermaster General, who was designated as the Director of Purchase and Storage, reporting direct to the Director of Purchase, Storage and

Traffic. The transfer of storage functions had, however, progressed much further on June 30, 1919, than had the transfer of procurement functions. The consolidation of procurement rendered necessary a consolidation of financial activities under a Director of Finance, who, together with the chiefs of the previously existing Embarkation and Inland Transportation branches, also reported direct to the Director of Purchase, Storage and Traffic.

Another important change in the organization of the General Staff effected by General Orders, No. 80, was the establishment of the Military Intelligence Division, which had previously been a branch first of the War Plans Division and later of the Executive Division, as a separate and coordinate division of the General Staff. This was necessary in view of the extent and scope of the responsibilities of this division.

A subsequent and important amendment was made in General Orders, No. 80, when, by General Orders, No. 86, dated September 18, 1918, there was established, in the Operations Division, the Personnel Branch, in which there has been effected a consolidation of the handling of the appointments, assignments, and promotions of all commissioned personnel in the Army. This action became necessary as the result of the condition which arose due to the competition among bureaus and services for commissioned personnel and in order that officers might be assigned in accordance with their special qualifications to the arm in which their services could be most useful.

Other reorganizations.—In addition to the reorganization of the General Staff and the consolidation of bureau functions above referred to, it was necessary, in the comprehensive and adequate reorganization of the War Department to establish certain new agencies.

At the beginning of the war the Quartermaster Department had, in addition to its other duties, been charged with construction, motor transport, the Transport Service, and the pay of the Army. It had, early in the war, developed that these duties were of such an unrelated character and involved operations on such a scale as to render necessary a separation of these functions from the Quartermaster Corps in order that it might accomplish the tremendous task otherwise devolving upon it. The necessity for this separation of duties was emphasized when, with the consolidation of procurement and storage, the Quartermaster Department developed into the great procuring and storage agency of the Army.

The Construction Division, which was organized as a separate agency from the Quartermaster Department in the early days of the war, was called upon to handle what was probably the greatest construction project ever undertaken, involving expenditures aggregating more than twice the cost of the Panama Canal. The rapid expansion of the Embarkation Service, which was also organized as a separate agency in August, 1917, is outlined elsewhere in this report. These agencies had already been separated from the Quartermaster Department and, following the experiences in the war, a new service, the Tank Corps, had been organized.

This reorganization was continued on my arrival. The development and procurement of material and the handling of the personnel pertaining to gas warfare, which was at that time distributed among four bureaus, was, on June 28, 1918, consolidated into a new service

designated as the Chemical Warfare Service, with a resulting marked increase in the efficiency of this service.

A similar consolidation of all motor transport activities and operating matters, which had previously been distributed among the various branches and departments, of which the Quartermaster Department was one, was effected in the organization of the Motor Transport Corps on August 15, 1918, which placed this important development of the war upon a sound organizational basis along the lines evolved as the result of our experience in France.

The separation from the Signal Corps of the Aviation Section of that Corps and its organization into the Bureau of Aircraft Production and the Department of Military Aeronautics, which was effected on May 29, 1918, facilitated production and served to coordinate, for the first time, the air program with the Army program as a whole. It resulted in a marked and general increase in the efficiency of that service, which was still further increased by the consolidation on March 19, 1919, of these two agencies into the present Air Service under the Director of Air Service.

The necessity for the consolidation of finance activities, arising in part from the consolidation of procurement, and in part from the necessity of a central agency to handle disbursements, and to review and to prepare estimates for Congress, has already been referred to.

Such in general were the changes effected in the organization of the War Department by November 11, 1918, when the armistice was signed. This organization was an evolution and a development. It was a necessary outgrowth of rapidly changing conditions, and it was put into effect under the stress of war. It was based primarily upon a consolidation of functions in the bureaus and services best adapted to handle them, and upon the direct and effective control of these agencies by the General Staff in such a manner as to direct their various activities to the accomplishment of the common end—the execution of the military program.

NECESSITY FOR GENERAL STAFF CONTROL.

The history of the Revolutionary War, the Civil War, and the War with Spain had shown the necessity of a War Department organization of this character; the experience of the first year of this war had demonstrated clearly that without such an organization the effective accomplishment of the tremendous military program required by a modern war was impossible.

Prior to the war, due to the legislative restrictions imposed upon its organization, no adequate General Staff organization was possible. Neither the bureaus nor the General Staff were, therefore, familiar with the best method of establishing an effective system of General Staff control. It was accordingly necessary for the details of such a system to be worked out, and for the necessary points of contact between the General Staff and the bureaus to be established, under the stress of war.

By March 4, 1918, when I became Chief of Staff, the critical military situation required action, and results, if the imperative needs of our Army overseas, and of the allied cause, were to be met. The existing organization of the various War Department bureaus and

services was such that it did not permit the efficient supervision and control of their activities which was imperatively required if the military program were to be carried out. The consolidation of related activities which was necessary to attain this end required a degree of actual administrative control, if results were to be secured with the expedition and effectiveness that was necessary, which, in some cases, was not essentially or fundamentally a General Staff function. Had a proper and adequate General Staff organization and supervision been in existence before the war this degree of administrative control by the General Staff would not have been necessary. Under the existing conditions, however, no other alternative existed if the military program as a whole were to be carried out, and I subordinated all other considerations to the attainment of that end.

PEACE ORGANIZATION.

Upon the signing of the armistice there was both the time and the opportunity for a clearer definition of the functions and organization of the existing agencies than had been practicable during the active continuation of the war. This work was promptly undertaken, and by June 30, 1919, the end of the period covered by this report, substantial progress had been made in this direction by a reorganization of the Purchase, Storage and Traffic Division which in effect established as four separate and distinct administrative and operating services, the Purchase and Storage Service (a development of the Quartermaster Department), the Transportation Service, the Financial Service, and the Real Estate Service, which, like all other operating bureaus and services of the War Department, are under the control and supervision of the Director of Purchase, Storage and Traffic, as assistant to the Chief of Staff, in all matters which pertain to the supply, transportation, and financial operations of the Army. Such control is essential to the accomplishment of any military program.

The experience of the war has unquestionably demonstrated that this organization is sound in time of war. It is equally sound in time of peace. To revert to a peace organization which must inevitably be disrupted again in time of war would be to discard the costly and invaluable lessons gained from the experience in this war. It is essential that the peace-time organization be such as to require, in time of war, merely the expansion of existing agencies—not the creation and organization of new ones.

RESULTS ACCOMPLISHED.

The general nature of the evolution of the War Department organization which was developed to carry into effect its military program has been outlined, and reference has been made to some of the considerations involved in the development of this organization. The results accomplished are indicated by the fact that on November 11, 1918, the date the armistice was signed, the total of the embarkations for France, as stated above, was approximately 2,082,000. Of these more than a million and a half had embarked within the preceding six months.

No movement of any such number of persons by water for such a distance and within such a time had ever previously occurred. Furthermore, no such troop movement had ever been considered possible. No studies made by the General Staff in this country prior to the war or during the early period of the war had contemplated the practicability of transporting more than 100,000 men a month across the Atlantic. A War Department estimate made late in December, 1917, contemplated 1,030,000 troops in France by October 1, 1918. A similar estimate made on March 1, 1918, contemplated that this number would be approximately 1,088,000. An estimate of the Headquarters of the American Expeditionary Forces, in France, of this same date, contemplated that the strength of the American Expeditionary Forces on September 1, 1918, would be 771,000. It is of interest to note in this connection that soon after the United States entered the war the chief of the German imperial general staff stated for the information of the German people and of the world that the United States could not equip and transport abroad within a year an army exceeding 500,000 men. On July 1, 1918, America answered with the statement that the first million had sailed, and a second million followed in the next four months. At the time the armistice was signed the strength of the American forces in France exceeded that of the English, and within the next two months it probably would have exceeded that of the French. On April 1 the Germans had a numerical superiority on the western front of not less than 300,000; at the time of the signing of the armistice the Allies had attained a superiority of not less than 600,000, due almost entirely to the arrival of American troops. These results speak for themselves.

The record established in the transport of the Army to France has been surpassed only by that established in effecting its return to this country after the signing of the armistice. The demobilization of the Army, which involved a reversal at full speed of the entire machinery of the War Department, afforded a severe test of the efficiency of the existing organization, and in particular of the General Staff. That this test was satisfactorily met is shown by the results attained.

Due to the necessity for the withdrawal by Great Britain of the greater part of her troop transports for use in returning her Canadian, Australian, New Zealand, and Indian troops, radical and immediate steps were necessary to procure additional troop transport tonnage for the return of the American troops, as the carrying capacity of the American flag ships on November 11 did not exceed approximately 110,000. I accordingly gave instructions immediately for the conversion of about 58 of the fastest and most suitable types of cargo vessels into troop ships. As the result of this action, of the use of such battleships and cruisers as could be assigned by the Navy for troop transports, and of the utilization of such other ships as could be secured, between November 11, 1918, and June 30, 1919, there were embarked from France for the United States 1,610,074 men, of which 84 per cent were returned in American flag ships, 8 per cent in British-controlled ships, 3 per cent in Italian ships, and 2 per cent in French ships. During the month of June all previous records were broken by the landing in this country of 343,786 men.

The work performed by the various divisions of the General Staff in connection with the execution of the Army program and in connection with the demobilization of the Army, to include June 30, 1919, will now be outlined.

During the year ending June 30, 1919, the following officers, as assistants to the Chief of Staff, were in charge of these divisions:

Maj. Gen. Henry Jervey, Director of Operations, throughout the year.

Maj. Gen. George W. Goethals, Director of Purchase, Storage, and Traffic, to include February 28, 1919.

Maj. Gen. George W. Burr, Director of Purchase, Storage, and Traffic, since March 1, 1918.

Brig. Gen. Lytle Brown, Director of the War Plans Division, to include June 15, 1919.

Maj. Gen. William G. Haan, Director of the War Plans Division, since June 16, 1919.

Brig. Gen. Marlborough Churchill, Director of Military Intelligence, throughout the year.

In addition to the foregoing chiefs of divisions, Maj. Gen. Frank McIntyre has, throughout the year, as executive assistant to the Chief of Staff, been my principal assistant, and has acted as Chief of Staff in my absence.

During this period, Col. P. P. Bishop, General Staff, served as secretary of the General Staff to include September 11, 1918, and Col. Fulton Q. C. Gardner, General Staff, has served as such since that date.

II. THE OPERATIONS DIVISION.

The Operations Committee of the War College Division in the first part of 1917 was charged with: (1) Arranging in accordance with prescribed Tables of Organization for the organization of tactical divisions and other troops by designating and assembling the specific units of which they were to consist; (2) making studies relative to tonnage available for shipment of troops, and preparing schedules for shipments to France. The Equipment Committee of the War College Division was charged with the preparation of tables of equipment for all units, and with the supervision of the distribution and issue of equipment to troops. In the reorganization of the General Staff, effected by General Order No. 14, War Department, dated February 9, 1918, these committees were consolidated into the Operations Division, in which the Operations and Equipment Branches with the same personnel continued to perform the increased duties of the old committees. In addition new branches were established for various additional duties assigned to this division. The general functions of the Operations Division during the war included the following:

(a) The recruitment and mobilization of the Army, including the assignment and distribution of the draft; the personnel of troops; the movement and disposition of troops; the determination of all overseas priorities.

(b) The appointment, promotion, transfer, and assignment of the commissioned personnel of all branches of the Army (after Sept. 11, 1918).

(c) Supervision of selection of sites for camps, cantonments, hospitals, and other construction projects for all branches of the Army except for harbor terminal facilities, including permits to build on military posts or stations, camps, or cantonments.

(d) The determination of types and the general basis of distribution of all types and quantities of equipment and supplies of all branches of the Army, and regulations concerning the same.

(e) The standardization of the design and the reception, storage, maintenance, and replacement of all motor vehicles.

It was responsible for the actual mobilization of the troops, for insuring and properly directing the equipment of these troops, and, in cooperation with the Embarkation Service, for directing their movement to the ports for transportation overseas, all in accordance with the Army program. In performing these duties the Operations Division came in contact with practically every branch and department of the Army.

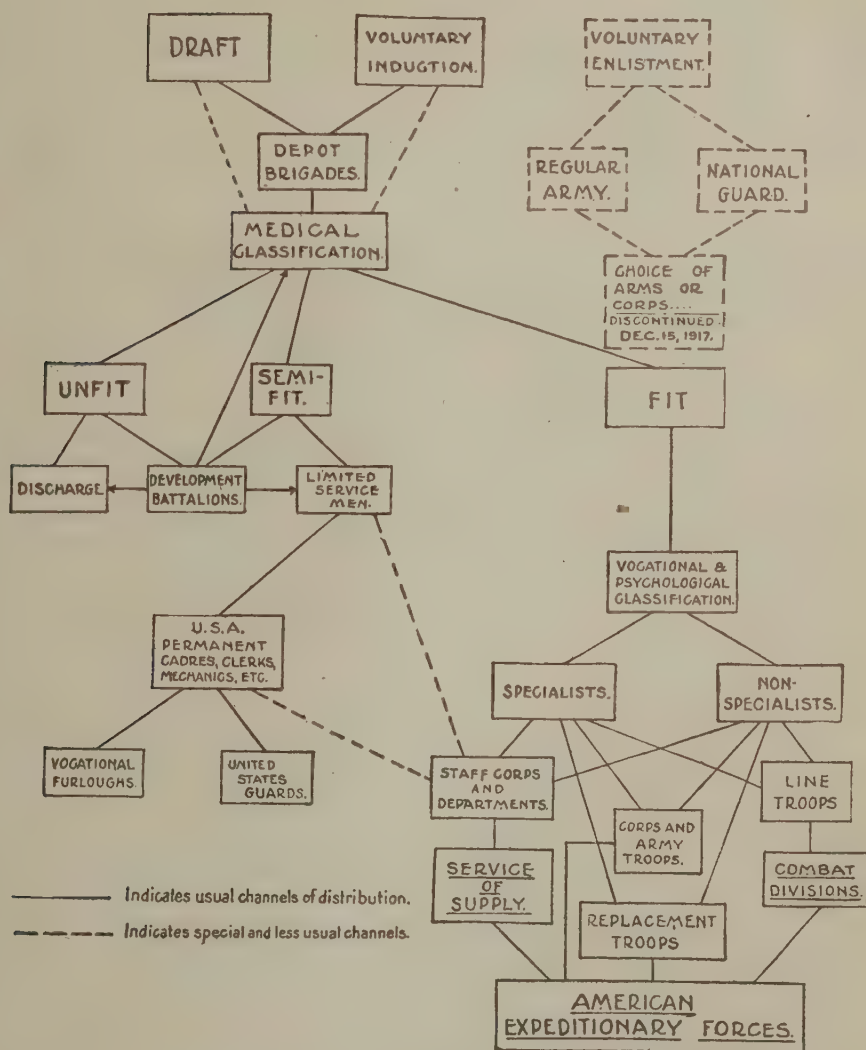
MOBILIZATION OF THE FORCES—THE OPERATIONS BRANCH.

Progress of mobilization.—On March 31, 1917, there were in the Regular Army some 128,000 officers and men. Between March 25 and June 23, 1917, in addition to the National Guard troops that still remained in the Federal service from the Mexican border calls of May 9 and June 18, 1916, the President called into the service of the United States a large part of the National Guard. On April 1, 1917, the enlisted strength of the National Guard in the Federal service was 63,395, and in the State service 110,933; in reserve, 8,207; total, 182,535. The entire National Guard was drafted into Federal service by proclamation of the President on July 3, 1917, and the draft was completed, with the exception of the National Guard of Hawaii and of a small number of the Virginia National Guard, on August 5, 1917. The maximum authorized strength of the National Guard when it was drafted into the Federal service was 13,093 officers and 419,834 men. The actual strength drafted in all, up to and including August 5, was 12,100 officers and 367,223 enlisted men (including National Guard Reserves). Of these the number of recruits having less than three month's National Guard service was, on June 30, 1917, approximately 130,000, or over one-third.

The Operations Branch of the Operations Division after the first few months was in charge of the mobilization of the Army. It controlled the supply of men for the Army and was in charge of the distribution and assignment of all men entering the service, whether such men were drafted men or volunteers. It determined in accordance with the approved policy when and how many draft registrants should be called, the camps to which men should be sent, the organizations to which they should be assigned, the priority in which organizations should be sent overseas, and the time when they should be moved from their camps.

Manifestly considerations of training dictated the calling of all men at the earliest possible date, but the lack of woollen clothing and equipment was one of the main factors which restricted the calls. With the advent of spring and warmer weather, the calls were greatly increased. The following table shows, in round numbers, the mobilization effected from month to month:

MOBILIZATION OF THE FORCES.



Month.	Drafted.	Voluntary enlistments.	Aggregate.
1917.			
September.....	297,000	<i>All ages.</i> 24,000	321,000
October.....	164,000	31,000	195,000
November.....	36,000	46,000	82,000
December.....	20,000	142,000	162,000
1918.			
January.....	23,000	<i>Outside draft ages.</i> 41,000	64,000
February.....	84,000	26,000	110,000
March.....	132,000	25,000	157,000
April.....	174,000	23,000	197,000
May.....	373,000	26,000	399,000
June.....	302,000	28,000	330,000
July.....	401,000	19,000	420,000
August.....	283,000	11,000	294,000
September.....	263,000	-----	263,000
October.....	107,000	-----	107,000
November.....	7,000	-----	7,000

The actual charge of the draft machinery and the direction of the details of calling the draft were in the hands of the Provost Marshal General. The number to be called and the time and place to which they were to report was fixed by the Operations Branch.

Sources of man power.—The men to be mobilized were drawn from two sources—voluntary enlistment and the draft. Throughout the spring and summer of 1917 the first source was heavily drawn upon to bring the Regular Army and the Federalized National Guard to war strength. It had been early recognized, however, that this method would prove defective, not only in providing the total numbers required, but in doing so in an orderly manner with the least possible disturbance of the industrial life of the Nation. The selective service law as passed by Congress May 18, 1917, without which it would have been impossible to have raised the men necessary for victory, provided a solution for these problems, and furnished a practically inexhaustible source of man power. The first draft of 687,000 men was called to the colors from September 5, 1917, to the spring of 1918. This draft not only gave the basis of the new National Army, but also furnished over 200,000 men to the Regular Army and National Guard, as well as to various special and auxiliary organizations. This draft had been made up of men from class 1 of the original registration of June 5, 1917, which had included all men between the ages of 21 and 31. It became apparent in the spring of 1918 that this class would become exhausted about September of that year. A second registration was held May 20, 1918, for men who had attained the age of 21 since the first registration.

In addition, and to meet the requirements of the enlarged program of July 25, Congress on August 31 authorized the extension of the provisions of the selective service law to include all men between the ages of 18 and 45 years. On September 12 a third registration was held on this basis. This provided a reservoir of class 1 fighting men adequate to any emergency. On December 15, 1917, voluntary enlistments were discontinued in order that more complete control might be established over the transfer of man power from industries to the Military Establishment. To meet the desires

of many to choose their branch of the service, however, and to provide for the needs of the staff corps and departments and of the Students Army Training Corps established in the fall of 1918, a modified form of voluntary enlistment through draft boards was authorized. This was known as "voluntary induction." While the urgency of securing men of certain special qualifications more rapidly than they were produced in the general run of the draft calls in many cases rendered this action desirable, in general the authorization of voluntary inductions produced an undesirable competition among the Staff Corps and special services concerned. It also impaired the accuracy of the records of the Provost Marshal General as to the available supply of men. While this plan undoubtedly served to expedite the formation of many units for shipment overseas it was, for the reasons above indicated, discontinued shortly before the signing of the armistice. This system was also used as the means by which men of the draft age could enlist in the Navy and Marine Corps. Selective service was, therefore, the real source of the new Army as is indicated by the fact that it provided 2,800,000 of the 3,700,000 men in service during the war. In all former wars, perhaps the greatest problem which this country had had to face was that of securing men. Profiting by our past experience and that of Great Britain in this war, Congress, by the foresight and wisdom displayed in the passage of the selective service act, rendered the problem of man power for the United States one of methods, and not of sources.

Reception of recruits.—In the arrival at the camps, under the supervision of the Provost Marshal General, of the men so summoned, each draft quota covered a period of about five days. These thousands of civilians pouring into the designated camps were selected men under the selective service regulations. Not, however, until they had passed into the control of the camp commanders and had been given another rigid physical examination, and not until all their records had been completed was their final entrance into the military service accomplished. It devolved upon the Operations Branch to control the assignment and use of all military camp and post accommodations. In the arrangements made for mobilization and future training all men allotted to the Aviation Section (later Air Service) were turned over to that arm, which had a system of concentration camps and flying fields entirely separate from the camps and cantonments of the balance of the Army, although under General Staff supervision. The building of the cantonments was authorized in May, 1917, the last site was secured July 6, and on September 4 accommodations were ready for 430,000 men. This capacity was shortly increased to 770,000 for the 16 cantonments built. Construction of the 16 camps went forward at the same rapid pace, providing for a total of 684,000. Troops were also accommodated at many other points, such as the extensive system of flying fields and other schools of the Aviation Section (Air Service), schools for the Artillery, Engineer Corps, Chemical Warfare, Tank Corps, Quartermaster Corps, the proving grounds and testing fields, embarkation camps at the ports, etc. For these purposes housing was constructed with a capacity for more than 300,000 men, bringing the grand total to about 1,800,000. This system had been built with the

expectation that it should accommodate an army from which approximately 1,000,000 men could be shipped overseas in one year. By May, 1918, because of developments abroad and increased shipping facilities, it was being called upon to receive an army from which a force must be shipped at more than double that rate.

A factor which early in the war rendered it impracticable to call the total number of men required to increase the actual strength of all camps and posts to their full capacity was that the need of special machinery to receive the drafts made necessary the restriction of their first mobilization to certain camps. The number of men, therefore, who could be drafted at any one time was affected not only by the capacity of the camps and by the availability of clothing, equipment, etc., but by the efficiency of the receiving machinery. There were established in each of the 16 National Army divisional cantonments what were known as depot brigades which performed this service. The depot brigades were originally intended to train that portion of the draft to be used as replacements. Later they acted as receiving units for men sent from the draft boards throughout the country, giving them their first elementary military training, classifying them, and distributing them as the calls arose to fill organizations in this country to full strength and to provide men who had had special and technical training in civil life for the organization of such special units as railroad engineers, radio operators, various construction projects, etc.

In calling the first draft to the colors many men were actually put directly into combat organizations and later in the war certain camps (notably, Camp McArthur, Tex.), in the absence of depot brigades, established special receiving units of their own. The difficulties, however, of assimilating recruits into the Military Establishment made it desirable and necessary to provide a uniform system for this task. The original authorization of depot brigades had been based on the idea that in addition to serving as receiving points, these depots would provide a surplusage of troops which was to be used as a source for man-power with which to supply vacancies caused by losses of all sorts. The function of receiving all drafted men entering these cantonments had indeed been undertaken by the depot brigades more to meet an emergency than in the performance of their main purpose, the provision of replacements. The history of mobilization during the winter of 1917-18 in the National Army cantonments is in greater part a history of the development in the depot brigades of this emergency service into a highly specialized receiving system.

The proper mobilization of the Army could only be accomplished by a well-planned and carefully directed system of distribution of recruits. In this task the old units had to be reorganized, split up, or combined; the new units were still to be created. A peculiar difficulty of this latter task arose from the fact that the National Army, in addition to providing 16 divisions, constituted the central source of man power for the completion and final organization of the Army as a whole.

The tasks of the National Army cantonments at the beginning included: (1) Receiving all drafted men; (2) equipping, examining, and classifying the men received; (3) selecting and training special-

ists from the drafted men for various organizations of the Army; (4) providing special treatment for drafted men unfit for combat duty but not sufficiently unfit to warrant their discharge; (5) creating and maintaining the National Army divisions; (6) filling Regular Army and National Guard divisions to authorized strength; (7) organizing units or supplying selected personnel for corps and Army troops, Service of Supply troops, and the various staff corps and departments; and (8) training and forwarding replacement troops for all these forces.

Many of these duties were eventually performed by special camps organized for particular purposes, such as the provisional depot for corps and Army troops, the replacement camps, etc.

Careful consideration was given to the desirability of the maintenance of the local character of units in training for service, but this plan was found to be impracticable. Each military unit is composed of a fixed proportion of specialists, all of whom could not be furnished by any section or region of the country with the highly irregular vocational distribution of its population. As an example, each division needed chauffeurs, mechanics, telegraphers, machinists, automobile repair men, engineers, carpenters, radio operators, etc., of whom there was a scarcity in farming and agricultural communities, whereas they predominated in manufacturing centers. Had local character of units been preserved, some divisions could not have operated because of the lack of such men who would have crowded the ranks of another division in which the skill of many would have been lost to the Army. Furthermore, if, for example, all replacements for the Twenty-sixth Division, which had 15,168 casualties, were to be drawn from New England alone, while another district furnishing men for a division serving in a quiet part of the front, and with no considerable losses, had to furnish only the replacements for the division from that district, an obvious injustice increasing as the war went on would result. Another effect would have been the consequent disorganization of an important manufacturing district. Irrespective of these phases of the question, however, it was considered that the prompt and satisfactory replacement of casualties would in itself have rendered it impracticable, under the conditions obtaining in actual service, to have maintained the local character of organizations, and the experience of the war demonstrated unquestionably the correctness of this decision. In view of these facts, it was decided to create a reservoir of replacement troops for all forces to consist of drafted men from all localities.

Practical difficulties of mobilization.—The first drafts were called to the colors in the early fall of 1917. Many complex problems followed the arrival of the quotas at the various camps. In particular three factors made increasingly difficult the carrying out of the original plans for supplying men from the depot brigades both to create special troops and to supply general replacements.

These factors were:

(1) The difficulty in the camps themselves of supplying large enough numbers of men to meet these calls as they arose (due to the lack of adequate reserve stores of woolen clothing and the impossibility of securing this clothing from the manufacturers before the winter had set in).

(2) The necessity of using drafted men to fill National Guard and Regular Army divisions scheduled for early departure (a necessity that took over 200,000 from the National Army cantonments).

(3) The necessity of providing technically trained specialists from the draft for the special organizations required by corps and Army troops, and the Services of Construction and Supply.

As a result there began a constant drain of drafted men from the National Army cantonments, which lost men faster than it was found possible to replace them with new increments. The first difficulty was eventually overcome by production meeting requirements.

The second was important in its effect, since the number of men taken from the National Army cantonments seriously affected the morale and efficiency of these cantonments. The remedy lay in calling more men to the service, which on account of the first factor, could not be done until the spring of 1918. The third factor was both important in effect and exceedingly difficult of solution. The rapidly expanding program called for a disproportionately increasing amount of Service of Supply, corps, and Army troops, which were largely made up of Quartermaster, Ordnance, Engineer, Signal Corps, Medical Corps, and similar special personnel. This demand was due to the fact that the creation and maintenance of our overseas Army at such a distance from the home bases, necessitated meeting with military personnel the requirements of the tremendous construction program without which the Army could not exist or operate. For the allies to maintain their own armies on the western front taxed their own abilities to the utmost, and it was necessary for the American Army to provide its own personnel for this work. The demand for specialists increased by leaps and bounds, and all military organizations in this country were combed over again and again to locate skilled men and transfer them to organizations where they were required in order to enable our overseas forces to perform their mission.

The necessity of a reorganization of the system of receiving, classifying, and distributing recruits in order to overcome these difficulties became evident. The basis on which the depot brigades were authorized was completely changed.

The enormous amount of administrative duties entailed in the various examinations, classifications and transfers made it apparent that the original incidental purpose of the depot brigades had, in fact, become, and should be recognized as, their main purpose. Throughout 1918 the great task of the depot brigades became the reception of recruits into the Army and their distribution to their organizations. To receive raw recruits; to separate the fit from the unfit, the literate from the illiterate; to classify them by intelligence and by vocational ability; to put them into uniform and instill the rudiments of discipline; and finally to group and entrain them to meet the calls always on hand, these were the final functions of the depot brigades. This was an arduous and unspectacular task involving much drudgery on the part of those who carried it out, but it was a task the successful accomplishment of which made our rapid mobilization possible.

The experience of the fall and winter afforded a clearer conception of the exact needs of the new armies, and of the composi-

tion of the increments received from the draft. This experience led to the establishment of specific units responsible for the performance of certain specific duties. Physical examinations were necessary; allotments, insurance, and service records must be prepared; if the Government were to receive full value of their services, the better educated and keener men must be discovered by mental tests and vocational skill had to be ascertained. At first, these results had been accomplished in a more or less haphazard manner by the overworked company and battalion officers. In the final organization as developed step by step in the late spring of 1918, special camp organizations were created for each such duty.

Special medical boards gave the recruit his physical examination; the camp personnel officer attended to his allotments and initial records; a psychological board gave him a special mental test; a trade-test detachment under the personnel officer determined his special ability. Through the company the men received their equipment, their first training and their initiation into Army life. Many men received from the draft suffered from minor physical defects which rendered them unfit for immediate service, but which might be remedied by medical attention. An astounding and alarming percentage could not speak, understand, or write English. These men, who had formerly held back the general progress of whatever units had received them, were grouped into the "development battalions" organized for the special purpose of enabling them to transfer these men back to the service, capable of performing a soldier's duties. A decentralization of duty and responsibility was developed within the receiving cantonments. Thus in general, the progress of these changes was toward a single receiving establishment in which all the detachments worked together, so that the recruit might enter one door in his civilian clothes, strip for his physical examination and first inoculation; pass to another room where he would receive and put on his new uniform; then to another room where trained clerks would prepare his records and allotments. As a final step his trade ability would be tested and recorded; whereupon the recruit would leave the building, ready for his first training.

Through the systems of examination and classification in the camps, the Operations Branch was able to ascertain the character as well as number of the recruits available for assignment to units at any time. The increasing movement of divisions overseas left more cantonments available and thus made possible a further decentralization of mobilization machinery. Replacement camps which were later established for special services, as described elsewhere in this report, not only trained replacement quotas for these services, but furnished a great part of the special units required for corps and Army troops and the Service of Supply. The National Army training detachments in universities and schools of all sorts produced thousands of specialists and technical experts. It eventually was practicable to provide a definite source of material for nearly every special unit as required. The combat divisions after the spring of 1918 were then able to devote their entire time and attention to combat training, with a minimum of distraction, and without suffering losses of personnel through requisitions to fill other units urgently needed.

This complete decentralization of functions whose course has been indicated was accompanied, however, by an equally complete central control by the Operations Branch. By this system the whereabouts and numbers of all classes of men were known, and as need arose for specially qualified men to fill organizations being formed the branch was enabled properly to distribute them.

The essential features of the final organization adopted at National Army cantonments were (a) the method of classification, (b) the system of requisition, and (c) the determination of priority in filling the requisitions. Classification was usually accomplished during the first 10 days after the recruit's arrival. Reports showing the vocational qualifications of all men were sent to the War Department and were promptly tabulated. This work was performed by the Committee on Classification of Personnel of The Adjutant General's Office under the immediate supervision and direction of the Enlisted Personnel Section of the Operations Branch. It was then possible to assign men coming into the Army as nearly as practicable to their own trade or former occupational training. The requirements of the Army were determined by general studies of the vocational composition of all military units, and by specific requisitions from the special services such as the Signal Corps or the Chemical Warfare Service, for the particular classes of men they needed. The Committee on Classification, under staff supervision, received all requisitions for enlisted men, analyzed their requirements and drew up the orders of assignment upon the basis of the tabulated reports and in accordance with the general program. Under this system the committee supplied 42 per cent of the Coast Artillery Corps, 44 per cent of the Field Artillery, 64 per cent of the Signal Corps, 45 per cent of the Engineers, and 41 per cent of the construction troops.

Another organization, the Committee on Education and Special Training, through its system of prefatory training of potential soldiers not yet called to service added greatly to the supply of men having knowledge of the trades desired while the schools for specialists within the Army itself played a final part in solving this most difficult problem—the provision of specialists. A final feature of the system was the determination of priority in assigning personnel to the units. This included troops for the line units to which went the vast majority of men drafted as well as the soldiers with special qualifications.

With an ever enlarging program, it was practically out of the question to meet at any time all of the demands for personnel. The calls for men on the part of all organizations early became insistent and each branch of the service, in its earnest efforts to furnish its enlisted quota on time and in a proper state of training, had exercised such zeal and persistency in its calls for men, that analysis of all needs and careful control of assignments by the General Staff were necessary for effective distribution of the men available. Indeed the original supply of men skilled in certain trades had been well nigh exhausted when the armistice halted new effort. The determination of priorities between requisitions from any one staff corps or department was made almost entirely upon the recommendation of the chief of the staff corps or department concerned, but,

priorities between requisitions of one staff corps and those of another, or of the line, were determined by the Operations Branch in accordance with the requirements of the shipping program and with due consideration to the relative minimum period of training required.

The final organization developed for the creation of the emergency Army, which included the establishment of special depots as reservoirs for particular classes of troops, such as replacement troops, corps and Army troops, service of supply troops, or individual specialists, accomplished in an efficient manner the assignment of men to duties for which they were best suited—the orderly fitting of round pegs into round holes and square pegs into square holes. In the absence of a system of universal training, and because of the lack of time to train the specialists within the Army itself, the assignment of men with particular civilian training to the positions within the Army which required a corresponding ability proved the best solution possible. It made it possible to shorten the time of organizing the new Army by many months.

Replacements.—There is perhaps no subject in which the experience of the war affords more important or conclusive lessons than in connection with the subject of replacements. For any army in the field the vacancies created by the dead and wounded are but a small part of the total number of casualties which must be replaced to maintain combat efficiency. An early estimate fixed the replacements at about 10 per cent a month needed for each combat unit at the front. This was at times exceeded. This 10 per cent loss would have meant theoretically complete change in personnel in each combat unit every 10 months. The percentage adopted after actual experience was an approximate average of 5 per cent of the total American Expeditionary Forces, combatant and noncombatant together, a percentage which amounted to well over 50,000 a month toward the end of the war.

The first plan, as has already been stated, was to train all replacement troops in the depot brigades at the National Army Cantonments, including not only those for the National Army, but those for the Regular Army and National Guard as well.

The plan adopted, which would probably have met satisfactorily the requirements of the extremely limited military program which was, at that time, contemplated, did not afford a satisfactory solution of the problem of providing the replacements required for the 30-division program which was soon adopted. It was entirely inadequate to meet the requirements for the replacements for the final 80-division program. Even prior to the adoption of this program it became apparent that the depot brigades, in view of the many and complex duties which devolved upon them in connection with receiving and distributing the drafted men, could not also adequately include the function of replacement training. Upon my arrival in this country I took steps to carry to their consummation at an early date plans for a new and more comprehensive system of training replacement troops on a scale commensurate with the increase in the military program over the earlier conceptions of 1917, which had been under consideration during the winter of 1917–18. This system abandoned any idea of using parts of divisional cantonments for replacement

training and contemplated utilizing entire camps for this purpose as soon as the departure of a sufficient number of National Army divisions would make such camps available.

In the meanwhile the serious problem presented itself of providing not only the replacements required for the troops overseas but also those required for the divisions scheduled for early departure to replace the very considerable number of vacancies which occurred due to the elimination of the physical and mentally unfit, aliens of disloyal tendencies, conscientious objectors, and other classes which were unsuitable for combat duty, and to provide the special and technical troops required for their efficient operation. It was realized that the replacement troops for these divisions might not be able to receive more than a limited amount of training in France before it would become necessary for the divisions to take their places in the front line and that it was essential to the efficiency of these divisions that they be furnished without delay replacements which had received the greatest amount of training possible.

The only practicable solution to this problem was to supply these replacements from the divisions scheduled for later departure and to replace them from the new draft quotas.

This plan, which was put into effect, necessitated the depletion of the divisions concerned to a degree which undoubtedly resulted in a serious setback to their training and which exercised a material effect upon the morale of both the depleted divisions and those that were brought to full strength as a result of this depletion. It was, however, an unavoidable measure which was necessary if the military program was not to be delayed, and which was warranted by the urgent military situation. The necessity of making adequate provision in any future military plans for initiating the training of sufficient replacements contemporaneously with the organization of the combat troops is obvious.

In order to provide to the greatest possible extent for the tremendous and inevitable requirements for replacements for the overseas forces involved in the increased military program, and in accordance with the plans for a comprehensive system of replacement training above referred to, beginning with April, 1918, replacement training camps were started as follows: Infantry at Camps Lee, Gordon, Pike, MacArthur, Grant; machine gun at Camp Hancock; Field Artillery at Camps Jackson and Taylor. Certain special camps in addition to their duties provided for the training of replacement troops for their particular corps or departments. Among these were Camp Joseph E. Johnston for the Quartermaster Corps; Camp Humphreys for the Engineers; Forts Oglethorpe and Riley for the Medical Department; and Camp Alfred Vail, N. J., for the Signal Corps. The purposes of these camps were to receive untrained men from the draft through the depot brigades and to give them thorough intensive training in their respective arms of the service. To insure that these replacements would be in adequate proportion to the actual needs of the combat forces, the system known as the "automatic replacement draft" was established. The purpose of this system was to send abroad each month replacement troops in a number which would more than provide for the total number of casualties during the month, and which would be propor-

tionately distributed among the different arms of the service. Thus, replacements for the Infantry, which had the burden of the heaviest losses to bear, was estimated at 60 per cent of the total draft for each month. The percentages of the remaining arms were fixed according to the relative proportion of the total number of each arm in France. It was possible to determine in advance from the programs and to check up from time to time according to special needs and emergencies, the approximate numbers of replacements which would be required for any given month. This number was then apportioned by Operations to the various camps in this country who were to organize and entrain these individual proportions in time to insure their being ready at a given date when the complete draft for the month would be assembled at a port of embarkation.

This system of replacement camps inaugurated in the spring of 1918 on the basis of the experience gained during the winter proved to be an adequate solution of the problem. Due to the fact, however, that the cantonments necessary for this purpose could not be obtained until the divisions which formerly occupied them had sailed abroad, it was impossible to put the practical details of the new system into immediate operation. Considerable alteration of the old cantonments was necessary, officers and instructors had to be trained for this special and important function, the raw recruits from the drafts of late spring and summer had to be assembled and given a certain minimum of military instruction before the replacement drafts could be drawn from the replacement camps alone. By early summer the new camps were able to furnish practically all of the combat troops for replacement, but after that date, due to the fact that the Allies had assumed the offensive which was pressed forward without cessation to final victory, the demands for replacements grew so great that it became difficult to take men in from the draft in adequate numbers to furnish the complete quotas, a situation further complicated by the influenza epidemic. By early fall orders had been issued which would have resulted in the wiping out of all past shortages in replacement troops, and would have supplied a steady flow of thoroughly trained men to meet future requirements, and notwithstanding the influenza epidemic, it was planned to make up all deficiencies by the end of November, 1918. The advent of the armistice, however, put a sudden end to all replacement functions. From January to November approximately 236,000 replacement troops had been shipped overseas. This was the equivalent of eight combat divisions or half of the entire National Army as originally assembled in 1917.

Conservation of man power.—Both in justice to our men and in order to make provision for sustaining the country's effort through 1920, or longer if necessary, every effort was made to conserve man power. Even with a new registration of all men from 18 to 45, and notwithstanding the accepting of volunteers for staff duty up to 55 years, in the spring of 1918 it became imperative that man power be fully utilized. As organizations were ordered overseas, a careful physical examination was made and all men found unfit for most arduous field duty were separated from the organization going overseas and left in camp. These men soon accumulated in large numbers in the camps and were taking up much needed camp space; they were retarding progress in training units for the front; they were

costing the Government a great deal of money, and they were not paying a dividend, so to speak. Something had to be done. The remedy found was the establishment of development battalions.

These units were organized in May, 1918. Within a month after their establishment, over 100,000 men had been transferred into these battalions. The men transferred had been originally brought into the service as physically fit for general military service, but on further examination had been found to have some defect which made it probable that they might not be able to stand the rigors of duty abroad, or which prevented them from being efficient soldiers. There were the flat footed, the enemy aliens, the non-English speaking, and illiterates; in fact all men who for some reason or other were not fit for combatant duty overseas. They did not belong in the hospital, yet they had to be cared for in some manner. In the development battalions the men were segregated and given specialized treatment or instruction for the purpose of fitting them for some useful work in the Army. Wherever one of these men could be used to do the work previously performed by a perfect man physically, he released such a man for combatant service overseas. From May to November, 1918, when these organizations were in operation, the battalions handled about 224,000 men. When the armistice was signed 129,000 men, graduates of the development battalions, had been assigned to useful duty, such as in clerical work, as overseers, and in various supply and administrative positions both in this country and abroad.

One of the interesting experiments conducted in the development battalions was the education of the great numbers of non-English speaking and the illiterates. By the use of modern methods for instruction in English it was found that in three months sufficient English could be taught to enable men to write letters home and to transmit simple messages. The experience thus gained in the development battalions system should be turned to account in obtaining men for our peace-time Army. With this idea in view, on May 1, 1919, the War Department began accepting for enlistment in a limited number, and for training at a recruit educational center established at Camp Upton, illiterates and non-English speaking citizens, a class which in peace time had been barred. The Army is now offering to these illiterates and non-English speaking, who enlist for three years, first of all a thorough course in English and, second, full citizenship upon honorable discharge, all in addition to military training, improved physique and opportunities for vocational training, and legislation has been recommended to Congress to authorize the continuation of this work, which should prove a valuable factor in the development of better citizens as well as of soldiers, of these people, after the termination of the emergency.

As has been stated, many men who were drafted as physically fit for general military service and who later proved to be unfit for this purpose, were passed through the development battalions and their services were saved to the Government. In addition to the above source of limited service men, on June 14 orders were issued to the various bureaus directing that there be drafted into the service the greatest possible number of men classified by their draft boards as not fit for full combatant service but available for special and limited military duties. This class of man was composed of those suffering

from defects of sight, absence of a few teeth, loss of a finger, etc., which rendered them unfit for first line service. Many of them averaged high intelligence and in mechanical skill.

The Provost Marshal General, about July 1, 1918, reported about 115,000 men available in this class. During the latter part of July a camp for such limited-service men was opened at Syracuse, N. Y. The first draft of 10,000 proved to be excellent material. Among those were thousands of clerks, stenographers, etc., who were much needed and who, it was found, were able to perform most useful and important duty. The first draft was quickly followed by a second and third.

The services of the limited-service men were so satisfactory that early in September the War Department policy was announced as follows:

In order to conserve the man power of the Nation, it is essential that every man who is physically fit for combatant service overseas be used solely for such service. Limited-service men must be used to the maximum extent for service both in this country and abroad. No general service men will be used in this country for any duty whatsoever which can be performed by limited service men.

Before the signing of the armistice 108,245 men classified by their local boards as fit for limited military service had been drafted into the Army.

Another step taken in the effort to conserve man power was the formation of the United States Guards. Previous to this time 12 regiments of Regular Infantry were being used to guard utilities such as railroad bridges, ammunition plants, wharves, etc. There had been the plan to have United States Guards which were to be recruited from volunteers beyond the draft age, perform the duties of guarding utilities. This plan had to be abandoned, for the time being at least, because recruits could not be obtained. Early in the summer of 1918, however, it was found feasible to revive the plan of organizing United States Guards because the product of the development battalions could be used in forming these organizations. In this way 25,000 of these men were used and the United States Guards, thus reinforced, replaced the regular regiments on utility guard duty at home, and released them for combatant duty overseas.

Final system of mobilization.—The work of a modern army requires that there be within its ranks men skilled in very many different trades. To provide and properly assign these men and at the same time disturb to a minimum the essential industries of the country, required the intricate machinery described. The final system was not put into effect at one time, nor was it originally conceived as a whole and adopted as a new project. The methods it used had been developed, partly in the camps, partly in the staff, throughout the winter. But as each new method arose in any cantonment and proved its value, it was quickly extended by the staff to the entire system. This resulted in a complete scheme for the organization of millions of civilians into a great army in the minimum of time and in the most efficient manner, founded not upon theory alone, but on actual experience and practice as well.

The chart on opposite page illustrates the general scheme of the final organization described.

Shipment of troops overseas.—An Army consisting entirely of Infantry, or entirely of Field Artillery, or Engineers, no matter how important the particular branch, could not function. Combat troops could not survive without the necessary auxiliaries for their maintenance and replacement, which are as necessary to the fighting troops as ammunition and bayonet to the rifle. It was, therefore, necessary that the kind of troops arriving overseas come in a certain order so that the Army should at all times be properly balanced. These requirements were met by Gen. Pershing's schedule of priority shipments of October 7, 1917, to which reference has already been made, and by amendatory cables. The maintenance of this regular schedule of troops, composed of units differently organized, equipped, and trained, required a complete coordination; otherwise endless confusion would have resulted. The men had to be mobilized and organized with the kinds of units wanted overseas at the time their periods of preliminary training should elapse; the supplies of clothing and equipment must be so adjusted that units not then scheduled for shipment might not have surpluses while those designated for departure lacked these things; sufficient transportation, both railroad and ocean, had to be available at the right times and places and troops and supplies had to be so assigned to ports and ships that no wastage of facilities should occur.

The preparation of a priority of equipment schedule, based on the priority of shipment schedule and constantly modified from time to time was thus made necessary. This schedule indicated in its proper order each unit to be shipped overseas for several months in advance and enabled the Supply Departments to concentrate on organizations in such manner as to prevent the issue of overseas equipment to troops not scheduled for immediate overseas service. Commanding officers of units about to sail which had not received their full equipment were required to forward periodic reports to the Overseas Priority and Troop Movement Section of the Operations Division showing when, where, and to whom they had submitted requisitions. These reports were then furnished to the liaison officers of the Supply Departments, and were traced back through the various channels of supply until the necessary articles were located and forwarded. In order to meet changes in the situation abroad, it occasionally became necessary to move troops from the mobilization camps to the ports without their complete equipment. In such cases lists of shortages were forwarded by wire to the Operations Branch which transmitted them through the liaison officers of the Supply Departments, and the necessary articles were supplied to the ports themselves without delaying the movement of the troops overseas.

The priority established for the shipment and equipment of troops also established the priority of supply in personnel to the organizations to the end that troops first to go overseas would be the first to complete their organization, training, and equipment.

The priority schedule also served as a guide for the Embarkation Service as it indicated the order in which troops should be called to the ports for shipment after they had reported their readiness therefor.

All troops were advised as nearly as it was practicable to do so of the approximate time when it was intended to ship them overseas in order that their program of training might be adjusted accordingly.

In the event of change, ample notice was usually given. Supply Departments were advised regarding all troop movements.

In order to insure an ample supply of troops at the ports, not only to fill all transports to capacity but in order that there might be an ample reservoir of troops as a reserve at the ports to guard against emergency, programs were prepared from time to time showing the troops that were scheduled for shipment overseas together with the contemplated dates of their movement from mobilization camps to ports. These programs, made after conference between the embarkation officials, the Inland Traffic Service (now Transportation Service), and the Operations Division, General Staff, usually covered shipments from camps to ports for a period of one month in advance.

The movements of the troops to the ports were so timed as to fit in with all other rail movements throughout the United States so as to avoid congestion and an excessive demand for equipment during a limited period.

The program gave the supply bureaus definite dates for the completion of equipment at mobilization camps, thus enabling them to stop shipments to these points that would arrive too late, or to direct them, if necessary, to the port.

The various corps and arms concerned, the supply bureaus, the Transportation Service, Inland Traffic Service, and the organizations at the ports of embarkation did the actual work involved in execution of orders, but coordination of all the intricacies of their work devolved upon the Operations Division.

The following table shows the rapid increase from month to month in troop shipment overseas during 1918:

	U. S. Army.	U. S. Marine Corps.	Total.
1918.			
January.....	46,708	1,089	47,797
February.....	48,009	1,087	49,096
March.....	83,785	1,081	84,866
April.....	117,203	1,432	118,635
May.....	244,211	1,606	245,817
June.....	277,897	778	278,675
July.....	306,295	.....	306,295
August.....	281,461	4,392	285,853
Total.....	1,405,569	11,465	1,417,034

The functions of the Operations Branch in connection with the demobilization of the Army, with which this branch was to a very considerable degree charged, are indicated elsewhere in this report in connection with the subject of demobilization. These functions were of at least as great importance and complexity as those connected with the mobilization of the Army, which are above outlined.

THE EQUIPMENT BRANCH.

While under the peace-time régime the General Staff had no responsibilities in the technical details of procurement, it was very directly concerned in the type and selection of the articles to be procured, and in the distribution and issue of the articles after they

had been procured. These matters directly affected the training of the troops and their eventual combat efficiency. Prior to the war the question of the type of equipment to be used by troops and the allowances for them was kept almost entirely in the hands of the different supply bureaus. Aside from such special boards of officers as might be convened from time to time, there was no provision for any central representative body to ascertain the exact needs of the combat troops and to insure that these needs would be met by the various supply departments. The logical organization to perform these duties, which indeed should form an essential part of its purpose of coordination and supervision, was the General Staff.

The Equipment Committee was accordingly formed in the War College Division at the beginning of the war. To this committee was given general supervision over the design and adoption of types of equipment and over its standardization, distribution, and issue. Due, however, to the impossibility of coordination between the various parts of the Army without a radical change in its entire organization, the greater part of this work was performed in the individual bureaus, both before and for some months after the declaration of war. The bureaus adopted equipment, conducted researches, and decided on the armament of the combat troops in general independently of the line of the Army or of the General Staff. The function of the Equipment Committee was largely advisory in its early development.

On the reorganization of the staff in February, 1918, the Operations Committee and the Equipment Committee together formed the basis of the new Operations Division. This reorganization had also begun a better definition of supply functions in general by creating the Purchase and Storage Division and the Storage and Traffic Division. These new divisions took over supervision and coordination of the tasks of procurement and transportation, and the Equipment Branch was charged with all matters of approval of designs and types, with the research connected therewith, and with supervision of the distribution of all equipment and the determination of priority in such distribution.

In addition, supervision over all questions of camp sites and construction were assigned to this branch. The construction at camps, cantonments and posts was a technical problem in its execution, and as such was handled by the Construction Division of the Army. The selection of sites, the amount and nature of construction, however, were important factors in the present and future distribution of troops; and the necessity of a central agency within the General Staff to supervise these matters led to the creation of a Construction Section in the Equipment Branch which coordinated all construction activities.

An Equipment Section handled all matters of approval of design for equipment, the research connected with it, and the basic allowance of all articles for the different Army units. This included investigation of new types of equipment, such as trench mortars, trench knives, harness, the new field shoes, the new method of fitting shoes, fire control equipment for machine guns, for railroad artillery, for anti-aircraft artillery, the standardization of motor vehicles and the changes which were made in uniforms in order to assist procurement.

A Miscellaneous Section was formed to care for the distribution of material, questions of rations, commutation, baggage allowance, etc., and to cooperate with the Operations Branch in planning any movement of troops by insuring that the proper bureau or supply branch was informed, in order that the distribution of material and the necessary transportation might be arranged.

In the early part of 1918 and until the establishment of the Purchase and Supply Division, the Equipment Branch was occupied in efforts to assist the procurement of the equipment which was being called for by the Expeditionary Forces. This task necessitated the preparation of tables of allowances for use in training in this country, and amounts to be transported overseas; the preparation of artillery procurement programs for the Ordnance Department; studies of the possible use of coast defense guns as mobile Army artillery, etc., etc.

After April, 1918, the Equipment Branch was charged particularly with the solution of the question of priority of equipment in connection with the rapid movement of divisions to France.

In addition to these duties studies were made of the "automatic supply" system; the question of reserve stores to be considered in calculating requirements; and in general all questions of supply which could aid or expedite the dispatch of troops abroad were studied in this central branch, as well as by the operating services themselves.

It has long been a standard rule for military operations that troops should be embarked on shipboard as organizations and carrying with them their full equipment together with supplies for a certain period of time, depending upon the conditions existing; furthermore, that the equipment and supplies should be loaded on board in such a manner that those needed first on disembarkation will be the first to be unloaded. In this way an expedition can be transported to a hostile shore and on effecting a landing the organization is complete, both in personnel and equipment, and able to undertake at once operations against the enemy.

In our first movements of troops to France, endeavor was made to follow the same principle, but it was soon found impossible to adhere to it, nor was there the same necessity that exists when landing in a hostile territory. The principal difficulty confronting our expeditions was not that of making a landing on the other side, which would have been the case had the landing been opposed, but was the lack of shipping to transport troops and supplies which were necessary for the operations in France. This made it incumbent to take advantage of every ton. Each vessel had to be loaded to its maximum capacity in order to transport the greatest amount with a given tonnage. Transporting organizations as complete units and with their full equipment and supplies is very wasteful of tonnage space. A further consideration was that we pressed into service ships of all types, some passenger ships which had no place available for the carrying of supplies and equipment, some cargo ships which were unable to take personnel. Consequently, very early in our movements it became necessary to send troops on one ship and their equipment on another. At this time the French ports had not been built up and the railways leading from the ports to the interior were

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badly congested, and as the troops and the equipment frequently went to different ports, the result was that they rarely got together in France.

This necessitated the adoption of a policy of entirely separating the baggage from the troops. The personnel was sent with the equipment which they carried on their persons or could store in the baggage room or ship's hold, the latter being limited to organizational records, bedding rolls, etc. The remainder of the equipment for the troops was sent on a separate cargo vessel and upon arrival in France no effort was made to supply that particular equipment to the organization which had used it in the United States. Instead, it was all pooled and issues were made from the pool to organizations as they needed supplies. So far as the shipments were concerned, this worked well but a later development came in that it was decided that additional tonnage could be saved, and also railroad transportation in this country, by sending across only new equipment direct from the factories. When a division was ordered from its training camp for oversea duty it then left the equipment which it had been using (except that carried on the person) in the camp, to be turned over to the new organization to be formed and assigned thereto. Upon its arrival in France it received a complete outfit of new equipment which had been sent over in bulk for that purpose. In this way the equipment lasted longer after reaching France, and therefore did not require replenishing so frequently, and the amount of railroad shipments in the United States was reduced. In this way the capacity of every ship was utilized to full advantage.

The work of the Equipment Branch in connection with the formulation of policies governing the disposition of surplus supplies and equipment, after the signing of the armistice, is referred to elsewhere in this report in connection with the subject of the demobilization of the Army.

Hospitalization.—The Equipment Branch was also charged with the general supervision of the hospitalization project. Before the United States entered the war the provisions for the care of sick and wounded consisted of those at the few general hospitals and the regular post hospitals scattered throughout the country, in all a little over 6,000 beds, which were of course needed entirely for the Regular Army as it then existed. Immediately after the declaration of war and the passage of the selective-service act, active steps were taken toward increasing the hospitalization. The Council of National Defense had already been in existence for some time and comprised a Medical Section which had compiled a great mass of statistics which proved of great value to the General Staff in formulating policies. From these statistics a good working knowledge was obtained of medical conditions in civil life, such as the hospitalization in the various medical centers, the amount of the same which could be spared for Army purposes, the proportion of doctors which should be left in civil life in the various communities, and other matters of that nature which were essential in order to avoid the disturbance of civilian conditions more than was necessary.

The first problem was to provide immediately bed space for the increased Army. Base hospitals were built in the various cantonments, one of which was located in each of the draft areas, but this

was not sufficient. Provision had also to be made for the sick and wounded who would be returned from France. The policy was adopted that patients should not be sent back to this country except where their recovery would be slow. In all cases where a comparatively early return to duty was looked for, they were to be retained in the hospitals in France. Nevertheless, it was known that as our forces became actively engaged large numbers would have to be provided for on this side, and the policy was adopted of providing general hospitals for such patients, distributed throughout the country in order that these wounded soldiers could be placed as near as possible to their homes. This was highly desirable as it enabled them to be within reach of their friends and relatives, and it also would provide a place to which they could come periodically after discharge if their conditions were such as to require further treatment or observation.

The immediate necessity of suddenly providing a large increased hospitalization precluded the carrying out of this policy at the beginning. It was essential to provide beds as soon as possible, and therefore existing structures had to be taken wherever found and converted into hospitals. The result was that in the beginning it was impracticable to observe this policy, but as the war proceeded and the immediate needs were taken care of, boards of officers representing the Surgeon General and the construction and real estate activities visited all parts of the United States with a view to establishing additional hospitals in the areas not sufficiently provided for at the beginning. Had the war continued a few months longer this plan would have been completed, as at the time of the armistice it was practically perfected.

Among the other methods adopted early in the war to provide for the immediate requirements, several Army posts were converted into general hospitals, the troops being withdrawn from them to the different camps and cantonments. Forts McPherson, Oglethorpe, and McHenry were turned over completely to the Medical Department, and a large portion of Forts Logan H. Roots, Benjamin Harrison, Sheridan, Snelling, Des Moines, Ontario, and Madison and Plattsburg Barracks. Fifteen hospitals were also provided for the treatment of special diseases, such as tuberculosis, insane cases, etc. During the influenza epidemic in the fall of 1918, emergency beds were provided by temporarily utilizing barracks and other structures. Omitting these temporary facilities the maximum bed capacity of 110,059 was reached shortly after the armistice.

In estimating the number of beds that would be required, the experience of our Allies, particularly the Canadians, was largely drawn upon. The situation of Canada was almost identical with that of the United States, and consequently the experience which they had had in the three years preceding our own activities was of great value. Based on those figures it was estimated, at the time the armistice was signed, that the maximum required would be approximately 80,000, and that this would be reached on or before February 1, 1919. As soon as the armistice was signed, sick and wounded in France who would have been retained there had the war continued were sent to the United States to await complete recovery. This more than offset the decrease in the United States caused by demobilization, so that the maximum number of beds occupied was reached about the be-

ginning of January and was somewhat less than the 80,000 estimated. It will thus be seen that our provisions gave a safe margin over the actual requirements.

Welfare buildings, rest and recreation rooms, and community houses were also erected to offer every comfort to the inmates of the hospitals and to permit of their friends and relatives visiting them.

While provision was made by Congress for the reconstruction and rehabilitation after discharge of the wounded soldiers, through the agencies of the Federal Board for Vocational Training and the Public Health Service, the soldier was first brought to a point of maximum recovery before discharge. In order not to waste time during this period of physical treatment and having regard for the therapeutic value of vocational training, 24 curative shops were established in which the wounded man could be given preliminary training after the actual wound was cured but before being brought to the point of maximum recovery. On reaching that point he was discharged from the Army and taken in hand by the civilian agencies above mentioned for the further prosecution of his training.

When the armistice was signed, the final plans for hospitalization were being formulated and projects involving the expenditure of \$14,052,968 were then, or shortly afterwards, under consideration. The expenditure of only \$4,503,285 was approved, and of this amount about one-half represented overruns in previously authorized projects. Very little new construction was, therefore, authorized and large amounts which had been approved prior to the armistice were immediately ordered discontinued. Subsequent events have fully justified the action then taken.

In January, 1919, arrangements were at once begun for the reduction of hospital facilities, and many of them have been turned over to the Public Health Service for the treatment of the former soldiers who are entitled to further reconstruction and rehabilitation. This demobilization is now proceeding fast and it is estimated that by September, 1920, all temporary hospitals will have been abandoned and only the permanent structures will remain in use.

Construction demobilization.—Immediately upon the signing of the armistice there was organized in the Equipment Branch a committee known as the Construction Demobilization Committee, to investigate the status of all construction work built for the operations of the Army and to make recommendations with reference to each existing project as to whether it should be entirely abandoned, completed in a modified form, or completed as originally authorized. In this connection representatives of each bureau and department concerned were called into conference.

As a result of these conferences, on the 31st of December, 1918, the committee had acted upon practically all existing construction work under the supervision of the Operations Division of the General Staff and had recommended for completion 28 projects, for suspension 107 projects, and for abandonment 483 projects. It is estimated that the amount of money saved by suspending and abandoning these projects totaled \$121,000,000.

The committee also took up the study of the disposition of the various training camps then in existence in the United States and its possessions. These camps were classified into National Army

cantonments of which there were 16, National Guard camps of which there were 16, aviation flying fields and balloon schools of which there were about 36, and miscellaneous camps, a list of which is included herein.

National Army cantonments.—Of the 16 National Army cantonments, 2 (Camp Lewis, Wash., and Camp Funston, Kans.) were constructed on land owned by the Government. The remaining 14 camps were either entirely or partially on leased land. A list of these camps is given below.

Shortly after the signing of the armistice the Director of War Plans Division, the Chief of the Construction Division, and the Director of Operations instituted studies as to what action should be taken with regard to the National Army cantonment sites. These studies developed the fact that it would cost the Government almost as much to pay the rental on these areas for the period of demobilization and salvage and to pay land and property damage claims as it would to buy the land outright and thereby obviate the payment of rentals and damage claims and in addition secure the fee to valuable land on which was constructed improvements which cost more than \$190,000,000.

It was recommended that the War Department purchase the cantonment sites rather than pay rental and damage claims. The matter was taken up with the Military Affairs Committees of the Senate and of the House and discussed with these committees. No action having been taken by Congress providing for the future military policy of the United States when it adjourned on March 4, 1919, the Assistant Secretary of War on March 20, 1919, issued instructions to complete the purchase of those areas at the National Army cantonment sites which were necessary for the operation of the cantonment and on which damages had been sustained equal or greater than one-half the cost price of the land.

There was forwarded to the commanding general at each camp a map showing the maximum area to be authorized for purchase, and he was directed to organize a board of three officers to examine the ground in detail and make recommendations as to what areas could be eliminated from purchase, in order to save money. These reports were received by April 15, 1919, and were carefully considered by the Construction Demobilization Committee. The acreage involved and the estimated costs of the purchases directed as the result of this study are as follows:

Camp.	Acreage.	Cost to buy.	Camp.	Acreage.	Cost to buy.
Custer.....	9,169	\$675,000	Lee.....	7,160	\$900,000
Devens.....	4,789	210,000	Meade.....	7,770	700,000
Dix.....	7,040	700,000	Pike.....	2,574	210,000
Dodge.....	3,050	750,000	Sherman.....	4,980	1,150,000
Gordon.....	2,770	750,000	Travis.....	729	260,000
Grant.....	3,780	900,000	Taylor.....	2,010	1,150,000
Jackson.....	19,308	500,000	Upton.....	6,183	200,000

In the Army appropriation bill for 1920 Congress indicated its approval of the above action by authorizing the completion of the purchase of the camp sites.

National Guard camps.—Shortly after the signing of the armistice a study was begun of the National Guard camps. There were 16

of these camps, namely, McClellan, Kearny, Cody, Fremont, Greene, Hancock, McArthur, Wadsworth, Wheeler, Logan, Sevier, Sheridan, Doniphan, Beauregard, Shelby, and Bowie. In December, 1918, orders were issued to the respective commanding generals to convene boards of officers to assess the value of the land and the amount of damages which the Government would have to pay upon abandonment. All of the camps except Doniphan and McClellan were constructed on leased land, and in most of the leases it was provided that the United States should restore the land to its original condition or pay for the injuries to the land.

In February and March the reports from the boards were received. Their labors had so reduced the total of the damages claimed at most of the camps that it appeared to be clear that it would be better to pay the damages than to buy the land. In the majority of cases a satisfactory basis of settlement was arrived at with the owners. At only one camp (Sevier) was there an entire failure on the part of the board and the property owners to get together.

Camp Greene was early abandoned and sold to a local corporation consisting of the property owners themselves. By this sale the Government automatically wiped out the damage claims and rentals. Camps Cody, McArthur, and Fremont were salvaged by the Construction Division of the Army; some of the buildings were sold at auction, others, especially at Camps Cody and McArthur, were salvaged and the material used in constructing accommodations for troops along the Mexican border. Camp Kearny was retained, due to its strategic location and exceptional training facilities.

By March demobilization at the remaining National Guard camps had progressed sufficiently to warrant steps to be taken to dispose of them. Camps Bowie and Shelby had been designated as demobilization centers and had to be retained for that purpose throughout the summer. On March 21, 1919, the Secretary of War authorized the sale of the surplus National Guard and certain miscellaneous camps by sealed proposals.

As the result of the proposals received, following the nation-wide advertisements, it was decided that the bids on six of these camps, namely, Bowie, Hancock, Logan, Sheridan, Wadsworth, and Wheeler should be accepted as satisfactory. Camp Beauregard was sold to the highest bidder on the condition that he donate to the State sufficient buildings for a National Guard camp, desired by the State of Louisiana. Camp Sevier was later sold without the assumption of damage claims.

In considering the returns received from the sale of these camps, the cost of the original construction can not in any way be taken as a criterion. The camps were all tent camps and the only buildings approaching substantial construction were the warehouses and the hospitals. In all cases except Wadsworth and Greene, the warehouses were reserved, and four of the hospitals were held out to be transferred to the Public Health Service of the Treasury Department. The other buildings, chiefly mess halls, were the merest shells in which the lumber had been cut into small pieces for their construction. The underground part of the camp, which was the most costly, consisted mostly of pipe not worth in salvage value the cost of digging up. The roads, drains, and ditches of course are valueless

from the salvage point of view. The movable stores, telephones, fire-fighting apparatus, refrigerators, refrigerating machinery, incinerator plants, laundry equipment, tents, and other equipment were not included in the sale. In brief, what was sold was the lumber and the pipes in the ground. The expense of removing these, borne by the purchaser, is very large in proportion to the value of the material obtained.

These camps were built for the training of troops and represented that part of the Army housing scheme of the most temporary nature. They were designed purely to meet military requirements and without any relation to their future salvage value. They were constructed in great haste at war prices for labor and materials. Under these circumstances the entire cost of the camps may reasonably be charged off against the operating expenses in training troops. These camps served their purpose in training. On the basis of the camps being filled only twice, 800,000 troops were trained in them at a cost for the construction part of the work of about \$30 per capita. The problem was not one of how much to depreciate the original cost of the camps in order to obtain the proper sale price but how much would the purchasers give for materials that were useless to the Government.

Flying fields.—Simultaneous with the study on the National Army cantonment sites a study was made in cooperation with the Director of Air Service as to the disposition of the various aviation and balloon fields acquired by the War Department during the period of the war. As a result of this study it appeared that all of the fields would be required for from one to three years for the purpose of storing valuable Air Service equipment in this country and to be returned to this country.

As there had been practically no Air Service fields prior to the war, it was necessary to retain sufficient fields for the needs of a service the size of which could only be estimated.

Four fields—Rockwell, at San Diego, Calif.; Langley, at Hampton, Va.; Post Field, at Fort Sill, Okla.; and Kelly No. 1, at San Antonio, Tex.—were owned by the Government, and it was recommended that they be retained for military purposes.

In addition, March Field, Riverside, Calif.; Mather Field, Sacramento, Calif.; Carlstrom Field, Arcadia, Fla.; Dorr Field, Arcadia, Fla.; Ellington Field, Houston, Tex.; Kelly Field No. 2, San Antonio, Tex.; Park Field, Memphis, Tenn.; Souther Field, Americus, Ga.; Selfridge Field, Mount Clemens, Mich.; Chanute Field, Rantoul, Ill.; and Scott Field, Belleville, Ill., were recommended for retention. Their purchase was approved by the Assistant Secretary of War on March 3, 1919.

The above fields give a total of 12 single-unit and 2 double-unit flying fields for heavier-than-air training and operations. The capacity of the 16 units is approximately 18,770 officers and men but can be expanded if necessary. Later Mitchell Field, Long Island, N. Y., and Chapman Field, Miami, Fla., were added to the list of purchase. Mitchell Field was selected because it was advantageously located for the aerial defense of New York City and vicinity, for which purpose no other provision had been made. On account of the large amount that had been expended by the Government for

drainage and improvements, and on account of the excessive claims of the land owners, it was deemed to the best interests of the Government to purchase Chapman Field, with a view to resale.

For the lighter-than-air training the balloon fields at Lee Hall, Va., and Forts Crook and Omaha, Nebr., were on Government-owned land and were recommended for retention. The purchase of the fields at Arcadia, Calif., and Brooks Field, San Antonio, Tex., was authorized. The four fields are conveniently situated geographically, giving one balloon school on the eastern seaboard, one in the Central Department, one on the Pacific coast, and one in the Southern Department.

For general repair work the engine and repair depot at Montgomery, Ala., was selected and the land purchased.

Gerstner Field, La.; McCook Field, Ohio; and Camp John Wise, Tex., were ordered abandoned. The remaining fields it was found necessary to hold temporarily for storage purposes. They are: Wilbur Wright, Dayton, Ohio; Taylor, Montgomery, Ala.; Payne, West Point, Miss.; Eberts, Little Rock, Ark.; Call, Wichita Falls, Tex.; Rich, Waco, Tex.; Love, Dallas, Tex.; Barron and Carruthers, Fort Worth, Tex.; and Hazlehurst, Long Island, N. Y. Bolling Field, Anacostia, D. C., is on Government-owned land allotted for park purpose and is being retained temporarily.

The following miscellaneous camps, which were in various states of construction when the armistice was signed, were either abandoned or sold or completed on a reduced basis:

Name.	Location.	Purpose of the camp.	Action taken.
Benning.....	Columbus, Ga.....	Infantry school.....	Completed on a reduced basis.
Bragg.....	Fayetteville, N. C.....	Artillery firing center.....	Do.
Knox.....	West Point, Ky.....	do.....	Do.
Vall.....	Little Silver, N. J.....	Signal Corps school.....	Real estate purchased.
Humphreys.....	Accotink, Va.....	Engineer school.....	Do.
Holabird.....	Baltimore, Md.....	Motor transport school.....	Do.
Jessup.....	Atlanta, Ga.....	do.....	Completed and retained.
Normandy.....	San Antonio, Tex.....	do.....	Do.
Eustis.....	Mulberry Island, Va.....	Coast Artillery school.....	Do.
Polk.....	Raleigh, N. C.....	Tank school.....	Abandoned and sold.
Colt.....	Gettysburg, Pa.....	do.....	Do.
North Camp Jackson.....	Columbia, S. C.....	Artillery firing center.....	Do.
Kendrick.....	Lakehurst, N. J.....	Chemical warfare school.....	Do.
Johnston.....	Jacksonville, Fla.....	Quartermaster school.....	Retained for possible future use.
Crane.....	Allentown, Pa.....	Medical school.....	Abandoned; and sold.
Syracuse.....	Syracuse, N. Y.....	Recruit camp.....	Do.
Forrest.....	Chickamauga Park, Ga.....	Engineer camp.....	Do.
Leach.....	Washington, D. C.....	do.....	Do.
Mills.....	Garden City, N. Y.....	Embarkation camp.....	Abandoned: to be sold.
Stuart.....	Newport News, Va.....	do.....	Do.
Hill.....	do.....	do.....	Do.
Alexander.....	do.....	do.....	Do.
Merritt.....	Englewood, N. J.....	do.....	To be abandoned and sold.

Army posts and reservations.—A study was also made of the military posts and reservations situated in the United States. All available information as to size of the posts in acreage and accommodations for troops, transportation facilities, training facilities, and general value for military purposes is available for use as soon as the future military policy of the Government is definitely determined. It is possible that the use of the National Army canton-

ments will make possible the sale or disposal of a number of these posts, but until such decision is reached no definite recommendations can be made. .

Such temporary construction on posts, reservations, and other Government-owned land as can not be used in peace time is being torn down and salvaged, in order to avoid deterioration and fire hazard.

THE PERSONNEL BRANCH.

Prewar conditions.—A general survey of the activities of the War Department in matters of commissioned personnel, both before and during the war, reveals many defects. There was much lost motion, lack of settled policies, and a very limited application of the qualifications and efficiency of officers in matters pertaining to assignment and duties. There was no general supervision of the procurement of commissioned personnel for the Army. In those bureaus having a chief there was some supervision over commissioned personnel, but each bureau followed its own course with little relation to any other and to the line of the Army. It was apparent from conditions existing that there was an urgent need for general supervision over the commissioned personnel of the entire Army.

At the outbreak of war the country had approximately 5,950 Regular Army officers (of whom 650 held provisional appointments), 3,150 officers of the Reserve Corps, 3,200 National Guard officers in State service and National Guard Reserve, a total of 17,750 officers of all kinds, of all degrees of training, and with no proper balance as to rank or arms. There was no comprehensive system for the expansion of this small nucleus to meet the demands of war. The expansion did take place during the war by improvised and uncoordinated means until at the time of the cessation of hostilities we had approximately 200,000 officers. Military efficiency, however, was hampered by the supply of officers constantly lagging behind the demand.

As with procurement, so with the transfer and assignment of officers. There was little general supervision and each arm or activity was competing to get the best regardless of other necessities.

So far as regular officers were concerned, there was no comprehensive tabulation of reports upon their efficiency or qualifications and their selection for various commands and duties was necessarily based upon the personal knowledge of officers, rather than upon the dormant, incomplete, and scattered reports on file.

Promotions in the Regular Army were, of course, governed by law. Promotions for the emergency were not properly controlled or coordinated in the absence of an organized controlling agency. Recommendations from many unrelated sources had necessarily to be accepted at their face value and approved.

The unsatisfactory conditions with respect to commissioned personnel had become more and more acute during the war and, with the enlargement of the military program, gave promise of leading to most serious difficulties unless all matters of procurement and distribution of officers were promptly brought under general control and supervision. This control and supervision are properly functions of the General Staff, and require a well organized branch for

that purpose. The procurement, control, and administration of personnel in the Army, as in an industrial organization, must be functionalized and given the individual thought and energies of individuals fitted for the task and can not satisfactorily be left as incidental tasks to officers charged with a multitude of other duties.

Establishment of Personnel Branch.—General Orders, No. 8, prescribed that the Operations Division should have cognizance and control of the appointment, promotion, transfer, and assignment of the commissioned personnel of all branches of the Army. On September 18, 1918, General Orders, No. 86, were issued which established the Personnel Branch and directed that all staff corps and departments would, after that date, submit requisitions to the Operations Division, General Staff, "for the number and kinds of officers needed for any particular organization or duty." General Orders, No. 86, abolished the commissioned personnel branches of the various staff corps and departments, as they had been operating before that date, and directed that their functions and personnel be taken over into the Commissioned Personnel Branch of the General Staff. During the period of transition, however, those branches for the time were kept intact and continued to function under instructions received from the Personnel Branch.

The enlarged military program, the speeding up of all activities, and the necessity for developing an entirely new organization from the limited personnel available at the time, as well as a lack of data, made the prompt and efficient organization of this branch a difficult matter.

One of the first steps was the creation of a Promotions and Assignments Section, which undertook at once the supervision of assignments and promotions for the whole Army. This section handled almost from the start several hundred cases a day bearing on personnel matters.

Work during war.—When the Personnel Branch was created there existed about 40,000 vacancies in commissioned officer grades in the staff departments to be filled without delay.

Strenuous efforts were directed to the immediate organization of the Procurement Section, whose function it was to secure commissioned personnel for the entire Army; to be able to fill requisitions from all branches of the service. During the month of October the organization of this section was laid out, personnel was assembled and instructed, and a nation-wide plan of recruiting was perfected, involving the establishment of central offices in 12 of the largest cities in the United States. The United States was, in this manner, divided into districts, so that the whole of the country was systematically covered in the recruiting efforts. The Military Training Camps Association, which had done a great deal of useful work for the War Department in procuring candidates for training camps and had established itself as an organization having the confidence of the country, was turned to for assistance. The patriotic and practically helpful assistance of the latter organization was of great value in the beginning of the work.

While the recruiting organization was being perfected, a system of classification of applicants was devised and arrangements were made with the various staff corps to submit requisitions for officers,

giving in each case specifications as to the qualifications desired. This system of classification was worked out in minute detail and was so arranged that any type of requisition could be filled immediately by reference to the classified file of applicants who had passed all the required tests and were qualified for appointment. A standard blank form of application for appointment in the Army was devised and the many blanks of differing types that had been used previously by the staff departments were discarded.

In a very short time the organization was in operation and by November 11, 1918, applications were being received at the rate of 400 per day, with the daily number rapidly increasing. Results indicated that the system was sound, that this centralized procurement should be a great improvement over the former method of each staff corps acting independently and would result in assignments according to qualifications.

The system of training schools in operation appeared to be functioning well, so far as material for the line of the Army was concerned. The Student Army Training Corps was also well established and gave promise of supplying additional material. These activities would, of course, in time have been incorporated in the general procurement system. Under the stress of filling the staff corps vacancies, this incorporation was deferred for the time being.

Work since armistice.—The work of the Personnel Branch was well under way when hostilities terminated. The problems of demobilization had to be solved at once and the actual discharge of officers and men begun. Difficult as the creation of an Army may be, the tearing down and shaping of it into a peace-time organization is even more difficult. The existence of such agencies as the Personnel Branch as a part of the General Staff was a most fortunate circumstance, as it made available an organized and trained personnel to carry out the policies of demobilization.

The organization of the Procurement and Discharge Section was immediately reversed on November 11, 1918, to handle matters pertaining to the demobilization of commissioned personnel. Policies governing the discharge of emergency officers were drawn with a view of causing the last officers to be discharged to be those who desired appointment in the permanent establishment and who, as a result of preliminary examinations, were recommended by their commanding officers to be finally examined for such appointment. There were approximately 200,000 officers in the Army on November 11, 1918. All of these officers had had valuable training and experience, either in France or in the United States, so that the United States found itself equipped with a larger reservoir of officers with military training than ever before in its history.

It being desired to take full advantage of this potential reservoir of trained officers, attention was given at once to the building up of a Reserve Corps of merit, and to the classification of emergency officers, with a view to selecting the best of these for future vacancies in the permanent establishment. At the writing of this report about 45,000 officers have been appointed in the Reserve Corps. The lack of trained emergency officers, available for call at the outbreak of the war, demonstrated clearly that a greater reserve of officers than we have had in the past must be maintained. One of the most important functions of the personnel branch is to superintend the

building up and the maintaining of an adequate reserve of officers, with a view to making it possible for the Government to mobilize at once, in the event of another war, the military population of the country of the officer class, and fit it into the fighting machine to the greatest possible advantage.

Experience indicates that in time of war approximately 50,000 officers will be required for each million enlisted men. In the absence of a determination of the future military policy of the country, tentative plans are under consideration for providing the necessary officers for an emergency army of 3,000,000. This means a reserve of approximately 150,000 officers. Of the appointments already made in the Reserve Corps, approximately 37,000 are of former emergency officers, and from data now available it appears that when the demobilization of commissioned personnel is completed about 75,000 trained Reserve officers will be enrolled from this source. The remaining 8,000 appointees are graduates of officers' training schools and applicants for Staff Corps appointment whose actual appointment in the emergency army was prevented by the termination of hostilities.

The general policy being followed in Reserve Corps appointments is to place the appointee in the position in which his active services terminated. Appointments in general are in the grade held at the time of discharge, an advance of not to exceed one grade being granted in those cases in which a record of special fitness or of a recommendation for promotion indicate that at the termination of hostilities promotion was imminent.

The records of each officer who requested, at the time of discharge, appointment in the Reserve Corps, are carefully examined and none but professionally and physically qualified officers are appointed. About 8 per cent of the applications have been disapproved. These disapprovals are indicative of faulty procurement during the war and of incompleteness of records of emergency officers.

The organization of the Reserve Corps and appointments therein are governed by the national defense act of 1916. Unfortunately, this act was not so framed as to provide for taking full advantage of a reservoir of trained material such as now exists. The act places a limiting age upon appointees of 45 years except in a few of the staff corps sections. It also fixes certain ages beyond which officers may not be appointed to certain grades and fixes the grade of major as the highest grade in all sections, except the Medical Section. A departure from these limitations was desirable and possible in making emergency appointments during the war. The limitations must be observed in making all inactive appointments and have proved most embarrassing to the War Department and to many excellent emergency officers who can not be appointed at all, or must accept a grade much lower than that attained by them during their active service. Recommendations for relief from this situation have been made to Congress and it is anticipated that a provision in the Army appropriation bill when passed will remove the limitations as to age and grade. If this occurs steps will be taken to at once adjust the appointments of those officers who have suffered under the limitations of the present law.

Numerous new services, such as the Air Service, Motor Transport Corps, etc., have been developed during the war. The national defense act does not authorize corresponding sections of the Reserve Corps. Until Army reorganization is determined, it has been deemed inadvisable to request authority from Congress to establish new sections of the Reserve Corps. Officers who served in these new staff corps are being held available for service by commission in an authorized section of the Reserve Corps with a notation on their records that they are for duty of a particular kind. For example, former Motor Transport Corps officers are being commissioned in the Quartermaster Reserve Corps for motor-transport duty only.

In addition to procurement for the Reserve Corps steps have been taken toward the procurement of material to fill, from the reservoir of war-trained material, such vacancies in the permanent establishment as now exist, mainly as a result of resignations, and as may be created in the reorganization of the Army. Early in December instructions were published giving opportunity to all emergency officers who so desired, to submit applications for permanent appointment. These instructions provided that applicants be given a preliminary examination and be rated by boards of officers and their applications be forwarded to the War Department for file. There have been received, classified, and filed to date about 25,000 such applications, 15,000 of which have been approved so far as the preliminary examination is concerned. From the data available it appears that a total of at least 27,000 such applications will be received, about 17,000 of which will have the approval of preliminary examining boards. Final examinations can not, of course, be held until the enactment of legislation reorganizing the Army, creating vacancies, and establishing the eligibility requirements and procedure for appointment.

Although examinations can not be held, working plans for the preparation of examinations and the conduct of examinations have been developed so far as the uncertainty as to legislation permits.

The policy of the War Department in the matter of such appointments is that the status of the applicant, at the time of examination, as to being in or out of the service, has no bearing upon appointment. Provision can not well be made for retaining all applicants in the service until examined, and incident to demobilization a large percentage of them must necessarily be discharged. Such discharge will in no way prejudice the applicant, and vacancies will be filled at the proper time by the competitive examination of all applicants. Regardless of such preliminary examinations as may be held, no applicant should be appointed who does not pass a thorough and satisfactory final examination.

In putting into effect the order of August 7, 1918, consolidating the Army of the United States during the war into but one Army, it was deemed advisable to discontinue provisional appointments in the Regular Army. There had been 6,094 such appointments made during the war. There existed at that time 899 vacancies in the Regular Army and 908 vacancies have occurred by resignations since the termination of hostilities. At this time there are 630 vacancies in the grade of first lieutenant, Medical Corps, and 982 vacancies in the grade of second lieutenant in the line of the Army. With the

exception of the Medical Corps, whose need for officers has become acute, and whose vacancies exceed the number of applicants for appointment, it has been found undesirable to fill these vacancies. The present law governing appointment of provisional second lieutenants contains restrictions as to age and the various classes of persons who must be considered in order for appointment. These restrictions would operate to cause discrimination against many desirable applicants whose applications are on file; would establish different age limits depending upon the source from which the applicant entered the service, and would fail to give the applicant any credit for his length of service during the war.

An added reason for deferring action in filling vacancies is that the pay of officers is not sufficient to draw into the service the class of men desired. A large proportion of our excellent young officers in the lower grades are leaving the service on account of inadequate pay and it is reasonable to assume that the men who would enter in their places would not be of the same high standard.

In accordance with the policy of placing all candidates for permanent appointment on an equality, the unsatisfactory eligible lists for provisional appointment that were established as a war measure have been abolished. The emergency officers who were on these lists have been placed in exactly the same position as all other emergency officers so far as appointment in the permanent establishment is concerned.

Policies relative to the discharge of emergency officers have been carried out by the Personnel Branch in such manner as to release, as rapidly as possible, officers not desiring to remain permanently in the Army. With the exception of medical officers and a few others of special qualifications, it has been found practicable to release most officers as early as they desired, after their arrival in the United States. In fact, the number desiring to remain in service either temporarily or permanently has been so great that the discharge of many officers earlier than they desired has been found necessary. Since the signing of the armistice, about 128,000 emergency officers have been discharged. It is anticipated that by the end of October the demobilization of both commissioned and enlisted personnel will be practically completed. There are still about 56,000 emergency officers to be discharged and, as the final stage of demobilization is approached the difficulties will increase. It will be impracticable to retain officers in service merely because they desire to be retained. The policy has been firmly fixed that when an officer becomes surplus at his station and there is no vacancy elsewhere for which he is needed, his discharge must, in the interests of economy, be accomplished at once.

When the stage of demobilization was reached that officers had to be discharged against their wishes, as liberal a policy as was permissible was adopted with a view to giving such officers opportunity to secure employment. Upon their certificate that leave of absence was necessary to secure employment, a 15-day leave of absence prior to discharge has been granted and the officer permitted to report for discharge, at the expiration of his leave, to the demobilization center nearest his home.

In addition to separations from the service by discharge, the Personnel Branch has exercised supervision over the retirement and

resignation of officers of the Regular Army. The condition with respect to retirement has been most unsatisfactory. The number of vacancies on the limited list has been so exceedingly small that many officers who have been recommended for retirement on account of physical disability are being held in active service. It is contemplated that advantage will be taken of the first opportunity presented to secure the necessary legislation to relieve this condition and to permit the retirement of all physically disqualified officers.

Resignations.—From November 11, 1918, to June 30, 1919, the resignations of 908 officers of the Regular Army, of whom 828 held provisional appointments, have been accepted. The policy pursued has been to accept resignations when tendered unconditionally, unless there is some exceptional reason for holding the officer in service. It is anticipated that in the year following the armistice, there will have been at least 2,000 resignations.

An analysis of resignations received reveals the fact that the main cause of such resignations is the inadequacy of Army pay as compared with the remuneration that competent men receive in civilian pursuits. Hundreds of officers state that they find their pay insufficient to provide properly for themselves and their dependents. Their financial stress is increased by the condition of necessary separation from their families.

Promotions and assignments.—An important section of the Personnel Branch is the Promotions and Assignments Section. Guided by the fundamental principle that promotions and assignments should be based on efficiency and qualifications of officers, the organization of this section is being developed along the lines that provide for the careful and accurate classification of all officers as to ability, suitability and availability for details. At the same time, data is being compiled as to the officer's efficiency as indicated by the records reaching the War Department concerning him.

Incident to demobilization there have, of course, been a great mass of assignments to be made in the Army, both of regular officers and of emergency officers being temporarily retained in the service. So far as practicable, with the data available, these assignments have been made in accordance with the above stated fundamental principle. During the process of demobilization it was necessary to obtain of various commands telegraphic requisitions for officers needed by them with a view to filling these requisitions from among officers reported surplus elsewhere. With the return of large numbers of officers from overseas, the requisitions have rapidly decreased, and there have been recently very few vacancies to which emergency officers reported surplus could be assigned. In such cases it has, of course, been necessary to direct the discharge from the service of such officers.

Another important phase of the work of this section has been the carrying out of policies with respect to promotion and demotion of Regular Army officers. So far as the latter is concerned, the general policy has been to return to their Regular Army grades officers holding emergency commissions who become surplus, who are detached from any duty pertaining to the emergency, or in whose cases reports of marked inefficiency are received. So far as promotions are concerned, the policy has been to permit only such promotions as give

the officer a rank commensurate with the duties being performed by him.

Special attention has been devoted to the selection of the necessary officers of the line of the Army to fill details in the staff corps and departments and to again place in full operation the schools of the service.

The early operations of this section have been greatly hampered by the lack of necessary data with respect to the efficiency and qualifications of officers. To remove this defect, the Data Subsection has been organized and is now at work upon the problem of securing and recording full data on all officers of the Cavalry, Coast Artillery, Field Artillery, and Infantry of the Regular Army. This data will be classified to meet the purpose for which secured, and will be consolidated and readily available for study and reference in selecting officers for promotions, details, and assignments. This system will be extended so far as applicable to the Officers' Reserve Corps and to retired officers. This is an immense task involving a great amount of detail, as the essential factor in the efficiency of such a system is thoroughness of records and data and the further requirement that they be kept strictly up to date.

A fair start has already been made in this work, and it has become very apparent that neither the old efficiency report nor the officer's qualification card used during the war is satisfactory. A new efficiency report is being developed and will be put in use at an early date. Both for present purposes and for future use, it has become apparent that classification of officers of the Regular Army with respect to their efficiency is necessary. The preliminary work of assembling and examining the records of all such officers is already under way. As soon as sufficient progress has been made it is contemplated that efficiency boards of all arms and branches of the service, composed of senior officers therein, will be convened for the purpose of classifying, in accordance with their records, all officers of the permanent establishment. To secure additional data for use of these boards covering an officer's service during the war, special efficiency reports covering the period of the war are being prepared for distribution.

A proper solution of personnel matters is a matter of vital concern to every present and potential member of our military forces. For a number of years there has been urgent need for a central organization to study the problems of Army personnel, to formulate policies and to direct the appointment, assignment, promotion, and separation from the service of officers. The results accomplished by the Personnel Branch to date indicate that a great step in the filling of this need has been taken. A comparison between the manner in which the expansion of our military forces at the beginning of and during the war was accomplished and the manner in which it could now be accomplished, as a result of the establishment of this branch, is in itself ample justification for the continuance and development of this branch as a permanent feature of the War Department organization. Full advantage must be taken of the lessons we have learned in this war in personnel matters as well as in matters of matériel, tactics, and strategy. Prior to the formation of the Personnel Branch, the General Staff functions relating to personnel were not

performed in our Army and its efficiency suffered because personnel questions which affected the heart of the Army itself had never been analyzed and comprehensively studied and the patent evils corrected. The time has come when we must put round pegs in round holes and keep up to date the scientific study of the officer personnel which has been started.

When the system which is now being developed in the Personnel Branch is in full operation, it will be practicable to control the entering into the service of officers, their assignment, promotion, and separation from the service in such a way as to place and reward individuals more strictly according to merit, to administer personnel matters more impartially to the best interests of the service, and to meet any emergency requiring an expansion of our military forces, in a manner that has not heretofore been possible.

THE MOTOR TRANSPORT BRANCH.

Motor vehicles.—Modern warfare introduced two new methods of transportation—aircraft and motor vehicles. Of these, aircraft, in spite of a few early extravagant predictions, was never available for troop movement. The rôle of motor vehicles, however, underwent a material expansion. The practicability of the rapid transfer by motor trucks of whole regiments of infantry and other troops, and of even larger units, greatly modified both defensive and offensive tactics. This use of motor vehicles by the line troops was a new development of the European war. Their employment by special and auxiliary services demanded great quantities of those vehicles. The types covered are many varieties of special trucks such as passenger cars, those carrying Mobile Ordnance Repair Shops, Mobile Dental Units, the ambulances for sick and wounded, motorized high power radio sets, motorized bath and laundry units, tractors, etc., in addition to the trucks used for hauling feed and ammunition and for transporting troops. To satisfy these demands, there was need for rapid procurement of motor vehicles and for a central control of their distribution to the troops that used them and of their use and maintenance, both at home and abroad.

The automatic distribution of food required a certain number of vehicles irrespective of changes in the tactical situation or the training of troops. In the field, however, it was impracticable for the larger units to maintain at all times the considerable number of such vehicles necessary to make them independent in the matter of transportation. Had a policy of permanent assignment been followed it would have meant that the approximately 200 trucks necessary to move an Infantry regiment might have remained idle for weeks while that regiment remained stationary in one sector. As the supply of these vehicles was at no time equal to the demand for the entire Army, this practice was impossible as well as wasteful. The necessity arose, therefore, first for a central agency to coordinate the procurement and standardization of motor vehicles and, second, for a special service to control the distribution, to operate in the field the motor vehicles used by the Army as a whole and to supply the technical mechanical experts needed to properly repair the machines. After some confusion in production and much delay and trouble in operation both in the camps at home and in the various

zones abroad, these needs were met (1) by the assignment of the duty of supervision of procurement and distribution to the Motor Transportation Branch, General Staff, provided for this purpose, and (2) the creation of the new Motor Transport Corps to perform the work of procurement and standardization, to train special personnel for drivers and repairmen, and to operate the very many different types of motor vehicles in use.

On the entry of the United States into the war, the designing and procuring of motor transportation had been a duty of the Quartermaster Corps which had gained its first motor experience in supplying the punitive expedition in 1916. When the expedition crossed into Mexico, the Army had no trucks and was, therefore, forced to buy whatever types were available. Upon the declaration of war, a standardized cargo truck had just been devised by the Quartermaster Corps. This, however, was but one type and when the Ordnance Department, the Signal Corps, the Engineer Corps, and Medical Department entered the market as independent bureaus to purchase motor vehicles adapted to their own needs, all efforts at standardization were hopeless. Each corps issued its own specifications and determined its own types, with the consequence that the Army supported and used many different types of vehicles with a consequent increased cost of production and maintenance. The productive capacity of the country was limited, and the fact that each corps purchased independently inevitably placed the Army in the position of competing against itself. The first advance toward centralization was the partial consolidation of all motor transportation into a Motor Transport Service, on April 18, 1918, which operated as a division of the office of the Quartermaster General. While this action corrected the former faults to a certain degree a more definite authority and supervision was necessary. This was accomplished in August, 1918, when the Motor Transport Corps was created and given control over the design, procurement, storage, operation, up-keep, and repair, of all motor vehicles and their accessories. It was further given control of the procurement, organization, and technical training of a Motor Transport Corps personnel to operate these vehicles.

On August 26 the Operations Division, General Staff, was given cognizance and control of the design, the standardization of the production, the reception, storage, maintenance, and the replacement of all motor vehicles. As a result, a special procuring and operating service, on a par with the other independent corps and services, such as the Tank Corps, the Chemical Warfare Service, was created; and a special branch created in the Operations Division to supervise the actual work and to coordinate its relations with the troops. In the case of this service these relations were very direct. Perhaps the most important single feature of the procurement of motor vehicles was the selection of standard types of vehicles for use by the whole Army and the consequent reduction of number of types and makes in use. The importance of this lay, of course, in that through this system it was possible to provide standard and interchangeable spare parts for nearly all vehicles, a vital necessity for general up-keep and for repair in the field. A special Standardization Board was appointed for this purpose on October 8, 1918, composed of

representatives of each corps and of the General Staff. At this time there were some 216 different makes of vehicles in use, many of which were represented by several different models. The obtaining of parts for this large number of vehicles to keep them in repair was consequently an enormous undertaking and practically an impossible one under war-time conditions, when manufacturers were bending every effort to procure the required number of completed vehicles. Complete standardization is rather an ideal than a practical end, due to inevitable fluctuations of production and of special needs within the Army. It was possible, however, to limit varieties to 10 or 15 different makes, and to include within this number all sizes of trucks, trailers, ambulances, and chassis for special vehicles, passenger types, motor cycles, and bicycles. This work was scarcely under way when the armistice was signed. As motor transportation is as much a peace as a war-time function of the Army, however, the work of standardized procurement and selection of types continued, with particular reference to provisions for a reserve of motor vehicles and for the methods of production supplementary to this reserve in the event of another war.

All motor vehicles in use by the Army were turned over to the Motor Transport Corps, for maintenance and operation in the case of vehicles for general purposes common to all troops, or for redistribution to those units which were permanently assigned definite quotas of vehicles for their special purposes. The fact resulted immediately in increased efficiency and economy of operation. Whenever possible a pooling system was put into effort, which resulted in a material reduction of the number of vehicles required at any particular time and place. The pooling system affected not only passenger but cargo vehicles, and with the passage of time and consequent increased familiarity with the operation of pools, greater reduction and increased efficiency have been affected. Until the armistice was signed, the burden placed upon the railroads by the shipment of enormous quantities of supplies to the Atlantic seaboard for shipment to France was greatly relieved through deliveries by convoy overland of large numbers of vehicles and huge quantities of spare parts and other motor supplies. The number of vehicles delivered by such convoys to New York and to Motor Transport Reserve Depot for shipment overseas was 32,402. The vehicles in these convoys invariably carried cargo in the shape of spare parts, accessories, and crated vehicles for light-delivery trucks. The total quantity of such cargo carried was 6,358,750 pounds, which reduced rail requirements by approximately 20,000 carloads.

The entire development of motor transportation during the war was an effort to meet a novel and emergency demand. Some experience in motor problems had been gained in the mobilization on the Mexican border and the operations of the punitive expedition before the war, but this experience, relatively speaking, was of the most limited scope as compared to the requirements imposed upon motor transport by the developments of this war. It is essential that the experience gained in this way be conserved and utilized.

Due to the shortage of tonnage, the complete motor equipment for the expeditionary forces was never shipped to France, and the success of this service abroad was vitally dependent on the efficient

methods of organization and operation of such motor equipment as could be sent. This efficiency was never attained with each staff corps and line organization operating its own vehicles; whereas with a central service in control of the entire supply of vehicles it was possible to concentrate and move from place to place, as the military situation demanded, large groups of vehicles, which could not have been collected under the old system, or, if collected, could not have had the cohesion obtainable only through operations by one central organization.

MISCELLANEOUS WORK OF OPERATIONS.

Supervision and direction of mobilization and troop movements was the largest and most important function of the Operations Division before the armistice, while demobilization was the main undertaking after that event. There was, however, in addition, an immense volume of miscellaneous problems referred to this division. In expanding our small Army to nearly twenty times its size, utilizing the resources of the entire Nation, and then in turn demobilizing the Army with equal or greater speed, hundreds of questions occurred almost daily, many of which were referred to Operations for action or for study. These matters not only related directly to the mobilization and demobilization of the Army, but included many other operations matters outside of these two activities.

Some of the problems involved matters of international policy such as questions arising with reference to the enlisting of United States citizens within the United States by recruiting officers of our allies, and with reference to foreign citizens or subjects serving in our Army. There were also various administrative questions to be settled, such as those connected with the application of the draft conventions with our allies providing that citizens of one country, residing in the other, must serve in their own country's forces or be subject to the draft in the country where they resided; the disposition of interned German civilians and war prisoners, and the determination of their proper treatment in accordance with international law; the furlough back to an industry essential to the prosecution of the war of men enlisting or drafted into the military service who were so highly skilled in specialized trades as to be indispensable; the granting of short farm furloughs to soldiers for the purpose of increasing food production; the standards of physical examination for drafted men, including questions involving the extent to which the standards could be lowered in view of the enormous demands of our man power. All such matters were referred to Operations. It may be said, incidentally, that the United States never lowered the physical standard for men to be accepted for combatant military service to include those who were not organically sound. These standards for general combatant service, although extended to include comparatively small men, prescribed sufficient weight, height and chest measurements for the accepted soldier to carry the infantryman's pack. Limited service men had minor physical defects, but none of such a nature that the work to which they were assigned in the Army could injure them. Cooperation with the Navy when the draft act of August, 1918, provided that the Navy should be supplied by the draft was also one of the functions of Operations. Problems con-

nected with guarding the Mexican border also came within the cognizance of this division as did other miscellaneous matters such as replacements for Siberian Expeditionary Forces and overseas garrisons in the Philippines, Hawaii, China, Alaska, and the Panama Canal; cooperation with the United States Employment Service in securing employment for discharged soldiers; questions relating to the Bureau of War Risk Insurance and Federal Board of Vocational Education; cooperation with the Department of Labor in connection with its efforts to naturalize all men who had not received their final papers; questions relating to the reenlistment of noncommissioned officers in their grades; the pay and status of enlisted men in which the War Department policy had to be administratively decided upon; and the question as to the disposition after the armistice of draft deserters. An enormous correspondence with Members of Congress, governors of States, etc., requesting information, was handled in large part by Operations.

III. WAR PLANS DIVISION.

Prewar organization.—Prior to the passage of the national defense act of June 3, 1916, the War Plans Division, then called the War College Division from the fact of being quartered in the Army War College, consisted of 21 officers, each of whom was a member of several of the following committees, viz, military preparation and policy; war plans; organization, equipment, and training; regular troops; militia; military education; military information and monographs; history; library and map room; legislation; and miscellaneous correspondence.

That provision of the national defense act which restricted the number of General Staff officers that might be stationed in or near the District of Columbia to one-half the authorized strength of the General Staff so reduced the War College Division personnel that during the six or eight months prior to the outbreak of war with Germany on April 6, 1917, there were but 11 officers on duty in the division. This number was so small as to prevent any definite organization into committees. A certain specialization in duties was maintained, but a large part of the work was assigned more or less promiscuously.

In spite of this small personnel it is worthy of note that a large amount of work was done in drafting regulations for and in putting into effect such provisions of the national defense act as those increasing the Regular Army and creating the Reserve Officers' Training Corps, Officers' Reserve Corps, Enlisted Reserve Corps, and citizens' training camps. At the same time there was prepared a study of a system of national defense based upon universal liability to military training and service, which formed the basis for the actual organization of the National Army, under the provisions of the act of May 18, 1917, into 16 divisional areas with a cantonment for each area, the exact location of the cantonments being determined by a study of strategic, transportation, and local conditions. Another important result of the studies made during this period was the establishment in May, 1917, of the 16 officers' training camps.

Under the provisions of the act of May 12, 1917, which increased the number of General Staff officers to 91, the number of such officers

on duty with the War College Division was increased to 50. These officers were assigned to the following-named standing committees, viz, recruitment and organization; military operations; equipment; training; legislation and regulations; and military intelligence section.

This organization continued in effect until February 9, 1918. During this period the important work of the division included plans for the reception of the first draft, the organization of the first 38 divisions, the training of the Army, the transport of troops overseas, and production and supply of the necessary arms, equipment, clothing, etc. It was due, in no small measure, to the plans and studies of this division that the initial organization and training of the first increment of the new Army was effected.

Under the provisions of General Orders, No. 14, War Department, 1918, dated February 9, 1918, which provided for a reorganization of the General Staff, the War College Division was organized into:

1. War Plans Branch (then including an Equipment Committee);
2. Training and Instruction Branch;
3. Legislation, Regulations, Rules Branch;
4. Historical Branch;

and was charged with:

- (a) Plans for the organization of all branches of the Army.
- (b) The study and determination of the types and the quantities of equipment and the approval of design and types of equipment submitted by the several bureaus; supervision of research and invention by the several bureaus or other agencies of the Military Establishment in connection with equipment.
- (c) Projects for national defense.
- (d) Training for all branches of the Army, the tactics and methods of warfare to be employed, together with all publications having relation thereto, and the supervision of military schools.
- (e) The translation and compilation of foreign documents relating to military affairs.
- (f) Collection, compilation, and maintenance of complete military records.
- (g) Proposed legislation and the preparation of regulations and rules for the Military Establishment.

Present organization.—Under General Orders, No. 80, War Department, 1918, the designation of the War College Division was changed to the War Plans Division. The principal change from the previous organization of this division was the transfer of the Equipment Committee to the Operations Division of the General Staff.

The War Plans Branch is organized into (a) the Organization Section, which is concerned with organization policy and the preparation of tables of organization for all branches of the Military Establishment; (b) the National Defense Projects Section, charged with the preparation of general war plans and, as successor to the Board of Review, with supervision of seacoast defense projects and plans; and (c) the Inventions Section, which has investigated thousands of inventions, suggestions and devices submitted to the War Department, thus relieving other agencies of this work, expediting consideration of valuable inventions, and rejection of those without value.

The increase in personnel of the War Plans Branch following upon the return of our forces from France and the lessons learned in the

European war have made possible a proper organization and a more systematic and intelligent study of military policy and plans than has heretofore been practicable. If this personnel continues available important progress may well be expected.

The Legislation, Regulations, and Rules Branch has been charged with the drafting of bills for the consideration of Congress designed to carry out recommendations of the War Department. Its work has also covered the preparation of a great variety of amendments, regulations, orders, and circulars. It has studied and made recommendations on many matters of international law and agreements, often in cooperation with the State Department, and has served as a center for consultation and advice on legal problems handled by other branches of the General Staff.

The Historical Branch is charged with the collection, compilation, and maintenance of complete military records. This duty had to some extent been provided for by the War College Library and the Record Section of the War Plans Division, which received, filed, and indexed such records as came through the General Staff. There also could be found the material furnished from the various observers in Europe, publications of various branches of the Government, and books of general military importance. A further agency, however, was necessary to collate, examine, and digest these records; to superintend their collection from all sources in this country and abroad; to take active measures toward collection of material which might otherwise disappear or not be available; and above all, to preserve the results of the study of this material in the form of military and tactical monographs, both for the use of the General Staff and for publication. This agency was provided for in the creation of the Historical Branch in June, 1918.

The organization of the branch provided a section, attached for the war period to General Headquarters in France, for the purpose of collecting and compiling those records, already priceless, of the actual operations of our troops overseas. The branch also provides a repository for official Signal Corps photographs and moving-picture films which are filed, catalogued, and made available to other Government departments and bureaus.

During the period, July 1, 1918, to June 30, 1919, the branches of War Plans Division, above referred to, considered many important subjects, the great majority being related to the military forces used for the prosecution of the war against Germany and her allies.

It is believed to be desirable to include in this report a résumé of the training activities in this country during the war; and the work of the Training Branch of the War Plans, which has had supervision of training matters, will be considered in connection with the general subject of training.

THE TRAINING OF THE ARMY.

Prewar training.—Prior to our entry into the war our only organized forces were those of the Regular Army and the partly trained National Guard. Our military training system had included schools at all camps and posts for the basic instruction of officers and noncommissioned officers, special service schools for the teaching of

the technique and tactics of the different arms and services, general service schools for the teaching of the use of the combined arms of the service and the Army War College.

An attempt had been made to organize an Officers' Reserve Corps and short courses of instruction had been imparted during the summer months in the Plattsburg Training Camps, the students being patriotic men who volunteered to attend.

Advantage had been taken of the opportunity presented by the mobilization of the Regular Army and the National Guard on the Mexican border during the year 1916 for the training of those forces to the greatest possible extent, and the experience gained during that period was of great value.

The divisions of 1917.—During the first year of our participation in the war 42 divisions were organized and all, except a part of the Eighth Division, were sent to France before the signing of the armistice. Of these 42 divisions 8 were Regular Army divisions designated First to Eighth, inclusive; 17 were National Guard divisions, designated Twenty-sixth to Forty-second, inclusive, and 17 were National Army divisions, designated Seventy-sixth to Ninety-second, inclusive.

On May 14, 1917, the units of all the increments of the Regular Army under the provisions of the national defense act approved June 3, 1916, were ordered to be organized to take effect May 15, 1917. These instructions resulted in the organization among others of 27 new regiments of Infantry, 8 new regiments of Cavalry, 12 new regiments of Field Artillery, 4 new regiments of Engineers. The training of these new organizations was at once begun at various camps and posts throughout the United States, the First Division was organized and sailed for Europe and later on the other regular divisions were organized.

By proclamation of the President dated July 3, 1917, the National Guard was drafted into the military service of the United States as of and from August 5, 1917. The National Guard divisions were organized and began their training principally in camps in the southern part of the country.

On July 18, 1917, the announcement of locations of cantonments for troops of the National Army and camps for the National Guard was made. Commanding generals to command the divisions of the National Guard and National Army were announced on August 23, 1917, and directed to proceed to the camps and assume command of the troops.

All of the organized tactical divisions of the National Guard and National Army were exempted under instructions of July 20, 1917, from the control of department commanders in all that pertained to, among other matters, instructions and training; this exemption applying after the troops had arrived at the divisional camps.

In September, 1917, the first of the drafted men reported at their camps and the National Army divisions were organized and training started.

The coordination of training.—When the personnel of the War College Division was organized into standing committees on June 16, 1917, one of these was designated the Training Committee, the functions of which was to coordinate the theoretical and practical

instruction of the United States forces and to handle all questions connected with such instruction.

Late in 1917 a major general of the Regular Army was designated as Director of Training. He was Chief of the Training Committee, reported at Washington for duty in December, 1917, and continued on that duty until March, 1918. At the time of the appointment of the Director of Training, the Training Committee of the War College Division was authorized to be increased to 20 officers, representing different arms of the service and staff corps, and the rôle of the committee was defined as follows:

(a) To study the methods of the war and the methods of instruction which are learned from them by means of the latest information sent from the front by the Staffs of Gen. Pershing and our Allies.

(b) To see that the execution of these methods in the camps and cantonments conforms to the instructions and orders of the Chief of Staff, who is responsible for the instruction of the Army.

(c) To improve continually the methods of instruction by direct and frequent contact with the instructors in the camps in order to secure the best possible results in the battles which were to come.

To accomplish the desired results the committee acting as the direct agency of the Chief of Staff, was charged with the following duties:

(a) Maintenance of close relations with the American Expeditionary Forces abroad and with troops undergoing training in the United States with a view to coordinating training that instruction might be progressive.

(b) Preparation of plans and policies connected with training.

(c) Supervision and coordination of the functions of the central schools (such as the School of Fire, the Infantry School of Arms, and the School for Provisional Second Lieutenants) and the divisional schools for officers, officer candidates, and enlisted men.

(d) Submission of recommendations for the publication and distribution of documents pertaining to training.

(e) The production and distribution of motion pictures as an auxiliary in the training of troops.

(f) The assignment and supervision of, and cooperation with, foreign officers on training duty.

(g) The study of the educational facilities of the United States with a view to the utilization of such facilities in the training of our forces at home and abroad.

The organization of the General Staff on February 9, 1918, provided that the duties of the War Plans Division would include the training for all branches of the Army; tactics and methods of warfare to be employed, together with all publications having relation thereto; and the supervision of all military schools. Those duties were assigned to the Training and Instruction Branch, which was merely a new name for the Training Committee. The supervision of the training of the Field Artillery was placed under the Chief of Field Artillery, an officer being detailed for that position on February 10, 1918.

The reorganization of the General Staff on August 26, 1918, specified that the War Plans Division should include in its functions the cognizance and control of training of the Army, tactics and methods of warfare to be employed, the publications having relation thereto,

supervision of military education and special training, publication of foreign documents relating to military affairs, inspections to insure efficiency and progress in training and instruction throughout the Army. The Chief of Field Artillery and the Chief of Coast Artillery were required to exercise direct supervision over the training of all Field and Coast Artillery units.

During that year of vital importance in training, from the summer of 1917 to the summer of 1918, the consecutiveness of policy had been greatly interfered with, due to changing personnel as, during this period, there had been four different Chiefs of Staff, four chiefs of the War Plans Division, and four Chiefs of the Training and Instruction Branch.

Some training measures.—Trench warfare, as it had developed during this war, had demonstrated the necessity of standardizing and making uniform methods of instruction and of perfecting them by constant exchange of information between the front and the rear. It was necessary that every lesson learned and method found successful in the war should be utilized in our camps of instruction and various schools. The living had to learn the lesson of the dead in order to obtain greater successes with less casualties.

With the view of standardizing and maintaining their training at the utmost efficiency, it was decided that our divisions would be required to follow programs established by the Training Committee approved by the Chief of Staff. These programs were valuable only in the manner of their execution and the improvement in conditions which they entailed.

A multitude of programs and letters of instruction relative to the details of training and the many different phases of instruction had to be prepared and issued, among some of the most important of which may be mentioned:

(a) Programs covering 16 weeks' courses of training for Infantry, Field Artillery, and machine guns, which were issued on August 27, 1917, for the initial training of the divisions.

(b) Regulations and programs for the officers' training camps and schools, depot brigades, and replacement centers.

(c) The revision of the programs referred to in (a). This revision was issued on December 20, 1917, and provided for a course of training 18 weeks in length.

(d) A course of training for divisions which had completed the preliminary and basic course of training. Issued on May 6, 1918.

(e) The confidential letter to division commanders covering the training and instruction of new divisions. Issued on August 27, 1918.

(f) The revision of the course of training noted under (d). Issued October 10, 1918.

In order that training might be coordinated, the Chief of Staff kept informed, liaison between troops and Training Committee maintained, the necessities of troops definitely understood, difficulties of instruction appreciated, methods observed, close relations maintained, information derived concerning the work of foreign advisors, and theoretical schemes be made susceptible of practical application, it was directed that members of the Training Committee should in the capacity of liaison officers visit from time to time the

points where instruction was being imparted, including the camps, cantonments, and central schools. These visits were not for the purpose of criticism but for consultation with commanding officers and observation of the practical workings of prescribed plans. A member of the Training Committee making such a visit acted as the representative of the Chief of Staff and had placed at his disposal by commanding officers any and all facilities desired in the prosecution of his task. Necessary reports or recommendations were made to the Chief of Staff through the Chief of the War College Division.

Briefly, the mission of the liaison officers was:

(a) To take to camps and schools necessary explanations as to plans of instruction and information, resulting from the experience of the Allies or recommendations of Gen. Pershing.

(b) To follow the progress of instruction in programs approved by the Chief of Staff and to assure themselves that the methods were uniform.

(c) To see the results obtained and to report to the Chief of Staff concerning the status of instruction in the Army.

On account of the urgent necessity for officers to assist in the training of the Army, the classes at the Military Academy were graduated before completing the regular four years' course, the dates of graduation being as follows:

Class of 1917, graduated on April 20, 1917.

Class of 1918, graduated on August 30, 1917.

Class of 1919, graduated on June 12, 1918.

Class of 1920, graduated on November 1, 1918.

Class of 1921, graduated on November 1, 1918.

After the signing of the armistice this class of 1921 was returned to the Military Academy on December 3, 1918, to take a special course until June 15, 1919. The course was shortened to one year in 1918 for the purpose of quickly training officers for the emergency, and was lengthened to three years on May 13, 1919.

A large number of officers and noncommissioned officers of the French and British Armies were requested for duty as advisors of training of the United States forces. These officers and noncommissioned officers were specialists in certain branches of training.

To each division and to the central schools there were assigned two groups of five officers and five noncommissioned officers. The French group consisted of specialists in artillery, automatic rifles, hand and rifle grenades, liaison, and pioneer work, while the British group comprised specialists in machine guns, light trench mortars, bayonet fencing, antigas and flame, and sniping.

In addition there were on duty with the Training Committee officers of the General Staff and different arms of the service from both French and British Armies. There was at Fort Sill an officer who was a specialist in the 37-millimeter gun, three additional officers of Artillery from the French Army, and an officer of the French Army who was a specialist in divisional trench mortars.

Specialists in other lines were supplied by the different allied armies to render assistance to the staff corps and special services.

These foreign officers rendered great assistance in training.

The commanding general of the American Expeditionary Forces in France was instructed to forward all programs, schedules, and

plans in regard to training of troops, and all division and department commanders were required to forward copies of schedules and instructions issued by them and used in their divisions.

The Inspector General of the Army was instructed to forward separate reports on methods and results of training and senior officers returning from duty with forces abroad and divisions in the United States, arriving in Washington, were directed to report to the Chief of War College Division for personal conference with the Training Committee, concerning existing conditions.

Training of the soldier for the purpose of combating venereal disease was vigorously and continuously carried on by every possible means, and that training was most successful with results that were extremely gratifying.

In September, 1917, it was decided to utilize motion pictures as an auxiliary in the instruction of troops. A field force was organized and a large number of reels carefully prepared. The exhibition of these motion-picture films, entitled "The Training of the Soldier," was on December 28, 1917, directed to be included in the course of instruction of organizations at those places where such films were received. The pictures were valuable as an aid in the instruction of troops and for the purpose of standardizing instruction.

A multitude of devices intended to assist in training were submitted, most of which it was not practicable to use. Careful consideration, however, was given to all propositions submitted and the decision relative to each one was made entirely on its merits.

A great deal of interest was evidenced during the war in various parts of the country with reference to predraft military training, and many recommendations and schemes were presented for the consideration of the War Department. Owing to the great demands for instructors and equipment it was decided that our energies should be devoted exclusively to the instruction and training of men over whom we had complete control. This limited our activities to men already in the military service.

Numerous offers and plans for the training of youths under military age were submitted, but it was not possible to attempt the instruction of those young men, principally due to the lack of officers.

Officers' training camps.—The quality of troops and their value as an effective force depends to a very large extent upon the character and sufficiency of their training, which in turn is dependent upon the officers who are designated to instruct them in camp and lead them in battle.

Consequently the first step in the upbuilding of the force of nearly 4,000,000 men which the armistice date found bearing arms for the country was the providing of officers to train their men how to fight, and on April 17, 1917, instructions were promulgated for the establishment of the first series of officers' training camps. Fortunately there was a law on the statute books which permitted the War Department to plan at once the methods of developing the first group of the great number of officers who eventually were commissioned in the service of the United States.

When the establishment of the officers' training camps were decided upon, the officers of the Cavalry, Field Artillery, Coast Artillery, and Infantry sections of the Officers' Reserve Corps were or-

dered into active service on April 30, 1917, to take effect May 8, 1917, and were assigned to duty for instruction at those camps.

In planning for an intensive course of training for three months, there was no thought that trained officers could be produced in that short period of time. It was believed, however, that some of the necessary fundamentals could be taught, and that the course would permit the selection of those who showed that they were capable of becoming instructors and leaders of soldiers, and that belief was fully justified by the results.

First series, officers' training camps.—The first camps, 16 in number, were established as follows:

Plattsburg Barracks, N. Y.-----	2	Fort Sheridan, Ill.-----	2
Madison Barracks, N. Y.-----	1	Fort Logan H. Roots, Ark.-----	1
Fort Niagara, N. Y.-----	1	Fort Snelling, Minn.-----	1
Fort Myer, Va.-----	1	Fort Riley, Kans.-----	1
Fort Oglethorpe, Ga.-----	1	Leon Springs, Tex.-----	1
Fort McPherson, Ga.-----	1	Presidio of San Francisco.-----	1
Fort Benjamin Harrison, Ind.-----	2		

There were eligible for admittance to these training camps officers who had already been commissioned in the Officers' Reserve Corps and citizens between the ages of 20 years and 9 months and 44 years. There were admitted 7,957 officers who had previously been commissioned in the Reserve Corps and approximately 30,000 selected civilians.

All who attended these camps were required to undergo the prescribed course of training, subject only to the exceptions made in the cases of those who were designated as assistant instructors in particular subjects, having already demonstrated their fitness for commissions. The reserve officers designated to attend these camps were placed on active duty while attending and received the pay and allowance of their grades and mileage to and from camp. At the end of the training period they were subject to regrading or discharge in accordance with the policy adopted by the War Department to commission officers in the line of the Army only on the basis of ability demonstrated during a period of training and observation at an officers' training camp. Many officers previously commissioned in the Officers' Reserve Corps were found entirely unqualified for commissioned grade and many were reduced in grade.

The civilian candidates received \$100 per month and were furnished subsistence at a rate not exceeding 75 cents per day. They were also allowed mileage from their homes to the camps at the rate of 3½ cents per mile and, if discharged, mileage from their camps to their homes.

The course was concluded August 11, 1917, and of the number admitted 27,341 were commissioned officers of different grades in line and Staff Corps.

Second series officers' training camps.—The results obtained from the first series of camps were so satisfactory that a second series was held beginning August 27, 1917, for the selection of officers capable of filling the grades above second lieutenant as well as vacancies in that grade.

The training camps were located at eight military posts in the United States and one in the Hawaiian Department. The camps in the United States were located as follows:

Plattsburg Barracks, N. Y.; Fort Niagara, N. Y.; Fort Myer, Va.; Fort Oglethorpe, Ga.; Fort Benjamin Harrison, Ind.; Fort Sheridan, Ill.; Leon Springs, Tex.; Presidio of San Francisco.

The classes of men eligible for admission to these camps were: (a) Members of the Officers' Reserve Corps (line sections) who, through no fault of their own, were unable to attend the first series of camps; also reserve officers of Staff Corps under 50 years of age with at least two months' service in war who had experience in Infantry, Cavalry, or Artillery. (b) Noncommissioned officers of the Regular Army recommended in March, 1917, for temporary appointment in case of war and who, through no fault of their own, were unable to attend the training schools for Regular Army noncommissioned officers in April, 1917; maximum age limit, 50 years. (c) Resigned officers of the Regular Army; maximum age limit, 50 years. (d) Men of proper qualifications made eligible for the Officers' Reserve Corps by the Army appropriation act of May 12, 1917; maximum age limit, 50 years. (e) Men who qualified for commissions under General Order No. 42, War Department, 1915; maximum age limit, 50 years. (f) Citizens of the United States having had war service in the present war as officers or noncommissioned officers of the line in the armies of allied powers; maximum age limit, 44 years. (g) Men of exceptional qualifications who tendered their services to the Government prior to June 5, 1917, and who were listed under the War Department Regulations of August 24, 1916; maximum age limit, 50 years. (h) Citizens with valuable military experience and adaptability for commissioned grade, or citizens who had demonstrated marked ability and capacity for leadership, and were clearly adapted for military service in commissioned grade; maximum age limit, 44 years. The minimum age limit for all applicants was 20 years and 9 months; however, in order to obtain the experienced class of men desired, preference was given to men over 31 years of age, other things being equal. Applications were submitted to examining officers appointed by department commanders for each of the divisional areas into which the country was divided for the purpose of apportioning the training camp vacancies. Each of the 16 divisional areas provided candidates for the corresponding training camp, and the examining officers selected and designated the men to attend. It is estimated that over 70,000 civilian applications were received and over 20,000 candidates were admitted to the camps. The duration of the course of instruction was three months, the same as at the first series. The course was concluded November 27, 1917, and a total of 17,237 officers commissioned.

Officers' training camps for colored candidates.—No colored candidates were admitted to either the first or second series of camps. A special officers' training school for colored men was established at Fort Des Moines, Iowa, on June 18, 1917. A contingent was selected in each geographical department from enlisted and civilian applicants and ordered to the schools by department commanders. The course began with a class of 1,250 students and continued four months to October 18, 1917, when 106 captains, 329 first lieutenants, and 204 second lieutenants were commissioned, making a total of 639 officers graduated, all in the Infantry arm.

Officers' training camp for residents of Porto Rico.—To provide a means whereby qualified residents of Porto Rico could secure commis-

sions the first Porto Rican officers' training camp was established at San Juan, P. R., on August 27, 1917. A class of 200 students was admitted, and at the conclusion of the training period on November 27, 1917, there were commissioned 27 captains, 47 lieutenants, and 106 second lieutenants, making a total of 180 officers graduated in the Infantry arm.

The second Porto Rican training school was held from February 1, to May 15, 1918, under practically the same regulations as the second series of camps in the United States, with the exception that the candidates could only be recommended up to and including the grade of captain. The candidates were selected from enlisted men and residents of Porto Rico. Training was given only in the Infantry Arm, and there were found qualified and commissioned 17 captains, 50 first lieutenants, and 186 second lieutenants, making a total of 253 officers graduated.

The Porto Rican Officers' Training School was established under the same regulations as the preceding camps at Camp Las Casas, P. R., June 21, 1918, and 600 students were admitted. The course was concluded November 6, 1918, and there were graduated 23 first lieutenants and 255 second lieutenants, all in the Infantry Arm.

Third series, officers' training camps.—The third series of officers' training camps, or more properly designated, officers' training schools, was established on January 5, 1918. There were 24 schools in the United States, and one each in the Philippine, Hawaiian, and Panama Canal Departments. Twenty-two of the schools in the United States were located in National Army and National Guard divisions, one was located at Fort Oglethorpe, Ga., and one at Leon Springs, Tex. The third series of officers' training camps was intended to produce line officers only, as the chiefs of the various staff corps and departments had before this time been authorized to conduct officers' training schools for obtaining their commissioned personnel.

There were eligible for admission to these training schools enlisted men between the ages of 21 and 40 years in all organized divisions, and enlisted men between the ages of 21 and 40 years from all organizations not in divisions except the Coast Artillery and the various staff corps; also graduates and undergraduates of recognized institutions between the ages of 21 and 31 years. Training was given only in Infantry and Field Artillery at all of these schools except Leon Springs, Tex., where a limited number of men from Regular Army Cavalry organizations were given cavalry training. The War Department had already announced that enlisted men were to be given every possible opportunity for advancement and were to be favored as far as the interests of the service would permit over civilian applicants for commission. In accordance with the above-mentioned policy approximately 90 per cent of the students admitted to these schools were selected from the enlisted personnel of all branches of the Army. The remaining 10 per cent were selected from men in civil life between the ages of 20 years and 9 months and 31 years who had received military training at recognized educational institutions under the direction of an officer of the Army during the preceding 10 years.

Enlisted men desiring to attend the school were obliged to submit their applications to their immediate commanding officers, who for-

warded same to the department or division commanders to be acted upon by boards of officers. These boards, from the names of those reported as being qualified, selected 1.7 per cent of the entire enlisted strength of the command to attend. The civilians submitted their applications to the professors of military science and tactics at the educational institutions who selected and designated the men to attend, quotas being assigned each of the educational institutions.

All civilians admitted to the school were required to enlist for the duration of the war and, if not successful, to complete the term of enlistment. While in training they received the pay and allowance of private first class, or about \$33 per month. Enlisted men designated to attend the school received the pay of their grades or, if privates, the pay of private, first class.

All men, both from civil life and from the Army, entered these schools with the understanding that they were not to be commissioned at the close of the training period, but were to be listed as eligible for appointment as second lieutenants, to be later commissioned as vacancies occurred, meanwhile retaining the status of enlisted men. While awaiting such appointment they were to be known as officer candidates. All successful graduates eligible for appointment, who were of the grade of sergeant or above, retained their grades as additional noncommissioned officers, and all below grade of sergeant were appointed additional sergeants.

To provide for a thorough course of instruction in Army paper work and company administration the training period was extended to three and one-half months and ended on April 19, 1918, the graduates being listed as eligible for appointment as second lieutenants in the following numbers:

Infantry	8, 165
Field Artillery	3, 347
Cavalry	147
Total	11, 659

It soon became necessary to utilize the services of these men as officers, and on May 29, 1918, orders were issued directing the commissioning of all officer candidates, graduates of the third officers' training schools, as second lieutenants in the arm of the service in which found qualified. They were accordingly commissioned and assigned to duty.

Fourth series, officers' training schools.—The fourth series of officers' training schools was inaugurated on May 15, 1918, in 24 National Army and National Guard divisions in the United States. Schools were also established in the Philippine, Hawaiian, and Panama Canal Departments, but the schools at Panama and in the Philippines were afterwards discontinued. To these schools enlisted men and certain members of the Reserve Officers' Training Corps units and educational institutions were admitted. It was originally planned that these schools should be a part of the divisions and would move with the divisions, but it was afterwards found necessary to transfer the men from their divisions and establish central officers' training schools. A small number completed their course of training in their divisions, the total number thus graduating being 2,418.

Central officers' training schools.—In June, 1918, central officers' schools were established at the permanent replacement camps. There were three of these schools for Infantry located at Camp Pike, Ark.,

Camp Gordon, Ga., and Camp Lee, Va., one school for machine gunners at Camp Hancock, Ga., and one for Field Artillery at Camp Taylor, Ky. Candidates from the divisions which were scheduled for early overseas' service were transferred to these central officers' training schools. The first class graduated at the central schools on August 26, 1918, 3,384 being commissioned as second lieutenants from the three Infantry schools. During August and September 3,690 were graduated from the Field Artillery central officers' training school. The machine-gun central officers' training school at Camp Hancock, Ga., graduated 649 officers on September 15, 1918.

On September 15, 1918, two additional Infantry central officers' training schools were established, one at Camp MacArthur, Tex., and another at Camp Grant, Ill. The capacity of each five of the Infantry schools was increased to 5,600 with an intake of 1,400 per month for each school. The length of the course was four months, and it was expected there would be graduated each month a total of 4,500 Infantry officers.

Due to the shortage of Infantry officers, instructions were issued on September 27, 1918, to graduate on October 15, 1918, the class which it had been intended to graduate on November 15. The shortage as reported under date of August 12, 1918, was as follows: Shortage, 1,326 captains of Infantry; shortage, 3,825 first lieutenants of Infantry; surplus, 520 second lieutenants of Infantry.

A Cavalry central officers' training school and schools for enlisted specialists and noncommissioned officers of Cavalry were established on September 17, 1918, at Camp Stanley, Leon Springs, Tex.

On November 9, 1918, the name of the Cavalry central officers' training school was changed to "Central Cavalry Training School," as it contained sections for enlisted men as well as for officer candidates. After the signing of the armistice a large majority of the officer candidates elected to take their discharge and the school was closed on December 5, 1918.

On October 1, 1918, the situation as to officers' training schools was as follows:

Infantry, 5 central officers' training camps.

Location.	Capacity.	Intake (monthly).	Length of course (months).
Camp Pike, Ark.....	5,600	1,400	4
Camp Lee, Va.....	5,600	1,400	4
Camp Grant, Ill.....	5,600	1,400	4
Camp MacArthur, Tex.....	5,600	1,400	4
Camp Gordon, Ga.....	5,600	1,400	4

Sixty per cent of the candidates were secured from the enlisted men of the Army, 20 per cent from civil life, and the remaining 20 per cent from the Students' Army Training Corps. The average number of graduates from each of these schools was about 1,000 per month.

Cavalry—Location of school, Leon Springs, Tex.

Number attending—Authorized number about 1,000 (450 of these were Texas National Guardsman and their course was for three months, the remainder were to have course of four months).

Total capacity—About 2,500 students.

This school was established for the purpose of training Texas National Guard officers and officers for five new Cavalry regiments.

Field Artillery—Location of school, Camp Taylor, Ky.

Length of course—12 weeks.

Intake per week—(a) Had been about 500 per week. (b) Expected to be about 1,200 per week.

Capacity—About 6,000; by December 15, to be about 13,000.

It was expected that 13,650 would graduate between October 1, 1918, and March 5, 1919.

Engineers—Location of school, Camp Humphreys, Va.

Capacity (projected)—3,000; actual, 1,800.

Number of graduates per month (projected)—750; actual, 600.

Length of course (projected)—Four months; actual, three to five weeks.

Machine Gun—Location of school, Camp Hancock, Ga.

Capacity—4,000 students.

Intake—1,250 per month.

Output—1,000 per month.

Length of course—Four months.

Coast Artillery—Location of school, Fortress Monroe, Va.

Capacity—825, being increased to 2,400.

Number attending—About 1,200.

Graduated—To October 1, 1918, 3,388; monthly output to be about 500.

Length of course—Three months.

On October 17, 1918, the establishment of the Infantry Central Officers' Training School at Camp Fremont, Calif., was directed, to which approximately 20,000 candidates were to be admitted. This school was never opened owing to the fact that the armistice was signed before the first class was organized.

In the meantime the entrance classes to the Infantry schools had been increased to 1,800 per month in each school, or total admittance for the five schools of 9,000 candidates per month, with an estimated monthly output of 5,850 officers.

On October 21, 1918, it was planned to admit to the central officers' training schools limited service men whose physical defects were of a minor nature, the number being limited to 5 per cent of each class. Only a few limited service men were so admitted due to the fact of the armistice being signed shortly afterwards.

After the first two officers' training camps, in which the Coast Artillery contingent was included, a separate Coast Artillery training school was established at Fort Monroe, Va., and conducted directly under the supervision of the Chief of Coast Artillery.

9,370 Infantry officers were graduated from the five Infantry officers' training schools, 2,456 were graduated from machine-gun central officers' training school, and 8,737 were graduated from the Field Artillery central officers' training school.

From the four series of officers' training camps and schools and from the central officers' training schools a total of 80,568 officers were graduated and commissioned.

On the date of the signing of the armistice, November 11, 1918, instructions were issued that no more candidates be admitted to

officers' training schools. A large majority of the candidates elected to take their discharges, but many remained for a few weeks and completed the course and were commissioned in the Officers' Reserve Corps.

Schools—The need of instructors.—In the early summer of 1917 the War Department was confronted with the enormous task of accomplishing in the shortest possible time the efficient training of an army of over a million men, divided as follows:

(a) The Regular Army, then in process of reorganization, in which more than two-thirds of the enlisted personnel of the Infantry and Field Artillery were recruits.

(b) The National Guard, to be organized into 17 divisions with an approximate strength of 420,000, of which only 30 per cent of the enlisted men were trained to a certain degree, the remainder being recruits. Forty per cent of the officer personnel was untrained.

(c) The National Army, to be organized into 17 divisions, the enlisted personnel of which was absolutely raw recruits, while the officer personnel was to be furnished largely from the officers' training camps then in operation and from among the noncommissioned officers of the Regular Army, each of the higher units to have a few officers from the Regular Army.

The problem of training this large force devolved, almost in its entirety, upon the trained officers of the Regular Army, and while there was a full realization of the urgent need for the presence of all officers with their organizations, it was apparent that provision had to be made with the least practicable delay for a corps of highly-trained specialist instructors who could be distributed throughout the many training areas to assist division commanders in the organization of divisional schools, and later, as their number increased, could be returned to their organizations and used as instructors in brigades and regiments.

Central schools.—There resulted a system of central schools, schools of doctrine, which became the foundation of the plan of training, for the provision of the necessary trained specialists and the insuring of uniformity in doctrine and methods of instruction the importance of which was incontrovertible. These central schools included the following:

(a) The Infantry Schools of Arms, at Fort Sill, Okla. (developed from the School of Musketry at that place), where instruction was imparted in the use of the rifle and pistol, hand and rifle grenades, the bayonet, automatic arms (such as the automatic rifle and light machine gun), heavy machine guns, and 1-pounder guns; in the duties of sappers, bombers, and pioneers; in the construction and utilization of field fortifications for line troops; and in the methods and matériel of gas defense.

(b) The School of Fire for Field Artillery, at Fort Sill, Okla., which had to be reestablished and greatly enlarged, the activities of that school having been suspended in 1916, due to the Mexican situation.

(c) The Mounted Service School, at Fort Riley, Kans., which was continued with modifications.

(d) Coast Artillery schools for noncommissioned staff officers and enlisted specialists.

- (e) Aviation schools.
- (f) Balloon schools.
- (g) Ordnance School of Application at Sandy Hook, N. J.
- (h) The Army Medical School at Washington, D. C.
- (i) Schools for bakers and cooks.
- (j) School for provisional second lieutenants at Fort Leavenworth, Kans.

Many other schools were established later.

The schools at Fort Leavenworth, Kans., were suspended in 1916 due to the need of officers with troops on the Mexican border, where the National Guard and a great part of the Regular Army were on duty. The school plant at Leavenworth was utilized for the training of a class of approximately 250 provisional second lieutenants of Infantry, Cavalry, and Field Artillery of the Regular Army, who were examined for commissions in January, 1917. After that class had completed the course in July, 1917, the school for the training of provisional second lieutenants of the Regular Army was continued at Fort Leavenworth, all untrained provisional second lieutenants assigned to the Infantry, Cavalry, and Field Artillery being required to take the course before joining their regiments. Those who had served at least one year in the Regular Army as enlisted men and those who were graduates of the officers' training camps were not sent to the school.

The character and scope of instruction for provisional second lieutenants assigned to the Corps of Engineers and the Coast Artillery Corps was prescribed by the chiefs of those corps, who also recommended the places to which the lieutenants were to be ordered to take the course of instruction.

The policy which did not permit officers who were commissioned in the National Army to serve with other forces than the National Army and which did not permit them to be used as instructors in central schools was very detrimental and was afterwards changed. By the 1st of September, 1917, all but one instructor had been ordered away from the Infantry School of Arms, all but one from the School of Fire, and several instructors had been ordered away from the school for provisional lieutenants at Leavenworth, all of which seriously interfered with the work of the schools at a very vital period.

Divisional schools.—The plan of training also included the establishment of the following schools in each division:

First. (a) Course for the tactical instruction of brigade commanders, staff officers, and regimental field officers under the direct personal supervision of the division commander, the course to be taken up during the first 16 weeks of intensive training and continued until the arrival of the division in France.

(b) Courses of like nature to be conducted for regimental officers in each regiment by the colonel under the supervision of the brigade commander.

Second. A system of divisional schools as listed below:

- (a) Infantry school of arms.
- (b) Artillery school.
- (c) School for stable sergeants and farriers.
- (d) School for mess sergeants, bakers, and cooks.

- (e) School for horseshoers.
- (f) School for company mechanics.
- (g) School of equitation.
- (h) School for supply officers and supply sergeants.
- (i) School for clerks.
- (j) School for saddler and cobblers.
- (k) Signal school.
- (l) School for bandsmen and buglers.
- (m) School of hygiene and sanitation, and such other schools as the division commander deemed necessary.

The policy with reference to the divisional schools contemplated that:

(a) Division commanders would direct the schools and select competent instructors.

(b) Divisional schools for officers would continue after divisions arrived in France and throughout the war, especially for frequent short "refreshing" courses covering various branches and phases of training.

(c) Schools would be kept in touch with the latest combat methods by the relief of instructors at least every three months and returning them to duty with troops.

(d) Continuity of best instruction methods would be maintained in the schools by avoiding relief of all instructors at one time.

(e) Divisions in France would be called upon to furnish a few instructors for each division training in the United States, wounded officers to be utilized if practicable.

Other schools and courses of instruction.—The officers' training camps and schools which were established for the purpose of selecting men competent to be officers are discussed under another heading. In addition to the central schools, the divisional schools, and those schools referred to elsewhere, there were numerous schools and centers of instruction established from time to time during the war by the different arms and services, and provision was made for special courses of instruction and training. Among those were the following:

The Coast Artillery School at Fort Monroe, Va., for special training of officers and enlisted men of the Coast Artillery service, with the Brigade School of Artillery Fire at Camp Abraham Eustis.

School for Bandmasters, Fort Jay, N. Y.

United States Army Music Training School, Governors Island, N. Y.

Training School for Chaplains, Camp Taylor, Ky.

Schools for horseshoers, teamsters, and packers, at each remount depot. The commanding general of each National Army cantonment and National Guard camp was directed to detail a certain number of men to take the course of instruction, which course of instruction was under the supervision of the Quartermaster General.

A brigade and field officers' school at Fort Sam Houston, Tex., with a short course for colonels and lieutenant colonels of Infantry and Field Artillery.

Vocational training schools at various educational institutions for training selected enlisted men in certain trades. These vocational schools maintained by the special services, while primarily for military purposes, had their curricula so arranged that the course of

training received was such as to be of the maximum benefit in peace-time pursuits.

Shortly after the declaration of war training schools were established at Army posts and camps for the instruction of such noncommissioned officers of the Regular Army as were deemed capable of becoming officers and a large number of these men were commissioned.

About 500 reserve officers were sent to Harvard University on August 26, 1917, for a three weeks course of instruction in trench warfare. They reported to the United States Army officer who was on duty there as professor of military science and tactics and had the advantage of the assistance of a group of French officers who were on duty at the university and who had planned and supervised the construction of a trench system of considerable extent.

To provide for the special training of lieutenants and unit commanders who would be needed to replace losses later on, there were sent to France after the close of the first series of officers' training camps 2,200 newly commissioned officers, of which number 1,000 were lieutenants of Infantry, 600 lieutenants of Field Artillery, 200 lieutenants of Coast Artillery, 200 lieutenants of Engineers, and 200 lieutenants of Signal Corps.

Courses of instruction were held at the Army War College from time to time. In the summer of 1917 there was a short course for officers who had been detailed to the General Staff Corps, the work in that course being done after the day's duties were completed by the officers. In the fall of that year there was a course for staff officers of National Guard divisions, and in 1918 there were courses for staff officers of new divisions.

After the divisions had been organized in the fall of 1917, most of the division commanders with their chiefs of staff were sent in different groups at different times to France for a period of about one month for a term of observation at the French and British fronts, under the direction of the Commander in Chief of the American Expeditionary Forces. From the viewpoint of efficient training this action was of special importance, and while these officers were taken away from their divisions at a most important time the resultant increase in the efficiency of training more than offset the disadvantage of the absence of these officers.

A course of instruction for higher commanders and staff officers of divisions was planned and was conducted by selected French and British officers under the supervision of division commanders.

Early in the war much thought, study, and work were devoted to the question of physical reconstruction and training of wounded soldiers. Plans were perfected for the training of such soldiers in the trades, professions, or other kinds of work that they might be able to do in their crippled condition.

On December 5, 1918, commanding officers of all posts, camps, and stations, including service schools and the United States Military Academy, were directed to establish schools for officers in shoe and sock fitting, utilizing as instructors, if available, officers who had completed the course at the Army schools for shoe and sock fitting, which had been held at Camp Meigs, Washington, D. C., Jefferson Barracks, St. Louis, Mo., and Camp Fremont, Calif. It was directed that such schools continue in operation until all company officers had

completed the course of instruction, which covered 12 hours, 7 of which were theoretical and 5 practical.

On January 21, 1919, schools were established for reserve and temporary officers who had elected to remain in the regular service. The schools for the Field Artillery, Coast Artillery, and Engineer officers were established at the location of the officers' training schools of those arms, namely, Camp Zachary Taylor, Ky., Fort Monroe, Va., and Camp A. A. Humphreys, Va. The school for Infantry officers was established at Camp Lee, Va., and that for Cavalry officers at Fort Sam Houston, Tex.

The object of these schools was to provide some means whereby the general worth and efficiency of these officers might be properly ascertained and whereby their training in the fundamentals of the military profession might be properly supervised and continued during the period of demobilization and reorganization.

The rapid discharge of temporary officers resulted in a decision to abandon these schools, and on March 28, 1919, all post, camp, and station commanders were directed to establish officers' schools which all permanent, provisional and temporary officers of the line of the Army (including officers of Engineers serving with troops), who had been commissioned during the years 1916-1919, inclusive, were required to attend. Such schools commenced operations on April 1, the school period covering two and one-half hours daily, with the exception of Saturdays, Sundays, and holidays. These schools were for basic instruction and were conducted under direct supervision of the post, camp, or station commander, who was held responsible for the proper conduct of the school and the efficiency of instruction.

The divisions of 1918.—Plans were perfected in the summer of 1918 for the organization and training of additional divisions. The training of the first six of the new divisions was commenced about August 1, and was to have been completed by November 30. The length of time to be devoted by all divisions was four months. The training required for all divisions in the first part of the course was to cover the training of units up to and including the regiment, this training to be in open warfare with a minimum of instruction in trench warfare and later on a definite period for combined training. The necessity for uniform training throughout all new divisions was appreciated, and every effort was made to obtain the end desired. It was found to be essential for uniform training that when once begun the program should be followed without modifications other than those imposed by weather, condition of equipment, or health of troops. The influenza epidemic seriously interfered with all training from September to November, 1918. The following was the general plan of training for these new divisions:

(a) All officers to be trained in the specialties, namely, in musketry, the technical handling of automatic rifles, hand grenades, and bayonet work before being sent to their divisions.

(b) No officer after being sent to a division to be detached to attend special service schools, but to be instructed within the division in schools as provided under existing regulations. The number of such schools were reduced by the fact that divisional schools in specialties for officers were not required.

(c) Units having once been organized, officers were not to be taken from their organizations except for a limited time each day

as indicated above, thus preventing separating the officer from the administrative and disciplinary control of his unit. The full complement of officers not only with an organization but also with a division to be provided and maintained.

(d) Officers, together with troops, of the special arms, where possible, to be trained at camps provided for that purpose.

(e) All schools for the training of specialists, such as the Infantry School of Arms, Artillery School of Fire, Engineer Camp of Instruction to be continued.

(f) Each officers' training center, except Camp Gordon, to be enlarged so as to have a capacity for continuous instruction of at least 6,000 men.

(g) Direct liaison between the Training and Instruction Branch and the divisions about to be organized to commence as soon as headquarters or staff personnel is at the new camps, and to continue at set intervals to insure progress and uniformity throughout the divisions.

(h) A course in staff duties for divisional chiefs of staff and their assistants in the new divisions to be given at least a month before such divisions are organized. This course to be given at the Army War College along the lines prescribed for the Army Staff College in France, but to be much more elementary in its nature, with a view to preparing these staff officers for entrance into the Army Staff College in France.

(i) A technical course outside of the ordinary administrative and routine matters connected with staff duties to be instituted in each division about one month after the division has started to organize, and to be continued for at least a month, lectures or conferences being held two or three times a week.

(j) The usual platoon and company commanders' school and regimental school for company officers to be continued. The special schools for instruction and training of such enlisted men as bakers, cooks, horseshoers, and packers to be continued.

(k) In each replacement camp a special class to be organized consisting of about 2,500 men to be designated as noncommissioned officer candidates. These men to have at least six weeks' training at the replacement camps and to form a reservoir with which to meet the replacement needs for overseas requirements and for new officers. Instruction to be provided for these noncommissioned officers to include the ordinary routine duties of instruction for recruits as well as instruction with special classes designed to develop their responsibilities and acquaint them theoretically with their duties as noncommissioned officers. Part of the instruction was to develop them as drillmasters in connection with the training of men of the organizations to which they are assigned. Their further training to be accomplished through noncommissioned officers' schools within the regiment.

(l) The training and organization of troops for the service behind the line and other auxiliary corps troops, as each group of six divisions completes its organization and begins to function as a corps, to be provided for in advance. This would prevent drafts being made on combatant organizations to meet the needs of auxiliary

troops for service behind the lines. Transfers for vocational reasons to be reduced to a minimum.

(m) Training officers who have been returned to this country from France to be used as instructors in our divisional schools for specialists and in special schools such as the Infantry School of Arms, and if the number becoming available permits, to be available for assignment to divisions.

(n) Each division commander to be informed as to the time available for training and as to the priority of the several subjects required for training.

(o) The Infantry regiments of divisions to be organized at the designated camps, but the special arms at camps now provided for this purpose; this to secure economy in instructors and special equipment, and uniformity in results. Exception to be made, however, in the case of the Signal Corps organizations belonging to the division, for part of their training must be given in the same camp with the Infantry. A nucleus of partly trained men for each Infantry regiment to be obtained from the replacement camps for Infantry.

The training of replacements.—Prior to 1918, replacements had come partly from depot brigades, partly from the untrained draft, and partly from partially trained new divisions. The taking of men away from divisions was a practice indulged in by all arms of the service. This undesirable practice, in addition to crippling the esprit of new units being organized and hampering the training of divisions, did not tend to inculcate the best spirit in the organizations to which the replacements were sent.

With the increase in our military program, the necessity became evident for the establishment of replacement centers where unassigned troops should be held and trained until called for as replacements, when these trained troops could then be fed directly to organizations needing them.

About April 1, 1918, the first replacement camp for Infantry was established at Camp Gordon, Ga. The success of this camp caused the establishment of three others for the same purpose, one at Camp Lee, Va., one at Camp Pike, Ark., and one at Camp MacArthur, Tex. About the same time as the Infantry replacement camps were being organized, replacement camps for other branches of the service were established.

On August 21, 1918, the following camps were designated as training centers, the primary activity of which was the training of replacements: Camp Lee, Va. (Infantry); Camp Gordon, Ga. (Infantry); Camp Pike, Ark. (Infantry); Camp MacArthur, Tex. (Infantry); Camp Jackson, S. C. (Field Artillery); Camp Zachary Taylor, Ky. (Field Artillery); Camp A. A. Humphreys, Va. (Engineers); Camp Abraham Eustis, Va. (Coast Artillery); Camp Hancock, Ga. (machine gun).

The instruction in the technical and staff branches was charged to the chiefs of those branches, to be conducted by them according to their needs, but supervised by the Training and Instruction Branch. The training for the Infantry and Machine Gun replacements centered in the Training Branch. A training circular was developed, based on actual experience in such training, and the whole scheme of replacement training was subjected to the same supervision and inspection as all other training.

Replacement training up to the time of the armistice was conducted on the following basis: Infantry, 60 per cent; Engineers, 13 per cent; Field Artillery, 8 per cent; Quartermaster Corps, 4 per cent; Medical Department, 3 per cent; Coast Artillery Corps, 3 per cent; Ordnance, 2 per cent; Cavalry, 1 per cent; Signal Corps, 6 per cent. Replacement training for the other services, such as Air Service, Chemical Warfare, Tank Corps, etc., had not been considered up to this time. The latter two services were in course of development, while the Air Service was more or less automatic in replacement. The need for more service squadrons was being supplied by transferring personnel from supply squadrons and other organizations that were not needed for the purpose for which they were organized in the first instance. This supplied the enlisted personnel, while the officer personnel was being turned out from the flying and balloon schools.

Rifle training.—If our troops are to be efficiently trained in the use of the rifle, it is necessary that they receive instruction in both marksmanship and musketry, marksmanship being the skill with the rifle which enables the individual to use his weapon with effect, to hit, while musketry is teamwork with the rifle, which enables a leader best to utilize the marksmanship of his men to defeat the enemy. The individual soldier must first be trained in marksmanship, and then grouped in a unit wherein the individuals and the leader are trained in musketry.

Marksmanship.—Instruction in marksmanship has for a long time been a prominent feature of the training of our Army, competitions and additional pay for qualification increasing the interest in this form of instruction with the result that marksmanship in the Regular Army before our entry into the war was excellent.

Upon the declaration of war the training in marksmanship of our enlarged Army presented three problems for solution:

1. The training of sufficient instructors.
2. The providing of equipment and facilities.
3. The providing of the necessary time for training.

The attempt was made to meet the first of these problems by including in the course at the officers' training camps the subject of marksmanship so that the junior officers would be competent to instruct their men in this important subject. At these camps, however, only about 38 hours could be devoted to this subject, the course being, in an abbreviated form, that which the recruit in the Regular Army received prior to the war. As a consequence, the newly commissioned officers joined their commands with an insufficient knowledge to permit them to be competent instructors in marksmanship.

The second problem, that of providing sufficient equipment and facilities, was met in part by installing in each National Guard camp and National Army cantonment a target range of 250 targets for the training of a division. Each of the ranges was larger than any range in the United States prior to the war. As there was not sufficient of the regular type of target carriers on hand to equip these ranges, the Ordnance Department developed and manufactured a new type of target carrier from material easily procurable, which has proved very satisfactory. The supply of gallery rifles being inadequate, practically no troops had gallery practice. The production in rifles was such that these were not received in sufficient num-

ber to start training before December, 1917. Had rifles been available instruction in marksmanship could have been started at least one month earlier for those divisions first formed.

When we entered the war with Germany the opinion prevailed that it was necessary to train our troops to a considerable extent in trench warfare, and the amount of ammunition which could be devoted to training was limited. Accordingly a new firing course was adopted, which included firing from trenches at short ranges and firing at mid ranges by selected men, but the course was modified in March, 1918, to include more firing in the open and to require all men to fire at mid ranges. Both these courses required less expenditure of ammunition than the regular qualification course in use prior to the war.

The third problem, that of providing the necessary time for training, is intimately connected with equipment and facilities. The available ranges had a capacity that made it possible to give a division the minimum prescribed training in marksmanship in two months.

Theoretically a division which was recruited from the first draft, and which was adequately equipped with rifles by December 15, 1917, should have completed the minimum prescribed marksmanship instruction by February 15, 1918. However, weather conditions were unprecedentedly bad, numbers of men had to be taken from many divisions and sent to France before they had had this instruction, and most divisions found themselves a month before starting for France below their required strength, and had to be filled up with newly drafted men at the last moment. It was physically impossible to give some of these men marksmanship instruction.

For the purpose of training instructors in marksmanship there was established in the spring of 1918 at Camp Perry, Ohio, a Small-Arms Firing School, designed to train 1,200 officers a month. At this school, a system of training marksmanship instructors was developed.

Musketry.—For a number of years preceding our entry into the war, training in musketry received considerable attention but was limited by the availability of areas suitable for the conducting of field firing problems.

The necessity for greater efficiency in the use of the rifle, especially in field firing exercises in large masses, resulted in the creation of the School of Musketry at Monterey, Calif., in 1907, which school was transferred to Fort Sill, Okla., in February, 1913, and in the summer of 1917 was enlarged and became the Infantry School of Arms.

The 10 years prior to 1917 saw the gradual development of a system of musketry which was the system in which students at the officers' training camps were instructed. In addition to theoretical study these students averaged six hours of practical application in firing problems when facilities were available. The total theoretical instruction was perhaps sufficient, but time and lack of facilities did not permit enough practical instruction.

Sufficient practical instruction of troops in the United States in musketry during the war was not possible. The time of training of some divisions was too short to permit the requisite amount of such instruction and in many localities it was difficult to obtain ground where the firing problems could be held with safety.

On September 12, 1918, there were transferred to Camp Benning, Ga., the Infantry School of Arms from Fort Sill, the Small-Arms Firing School from Camp Perry, Ohio, and the Machine Gun School from Camp Hancock, Augusta, Ga., and on October 9, 1918, it was definitely decided to establish at Camp Benning an Infantry school. In February, 1919, the scope of the school was enlarged so as to cover the entire field of Infantry technique and tactics to include the thorough training of the battalion in cooperation with other arms. The Infantry School of Arms was merged into this greater Infantry school and in general forms the technical portion of the larger school.

For the correct training in the use of the rifle the terrain must not only permit the training of thousands of riflemen in accurate target practice but also permit field firing exercises of large bodies of troops, attacking precisely as in action, against silhouettes so located as to represent the enemy and indicate the accuracy of the fire delivered. The site at Camp Benning satisfies this requirement, there being a tract with proper back stop on which 1,200 targets may be placed for the training of 1,200 individuals at one time. There are ranges nearby for the machine guns, hand and rifle grenades, automatic rifles, Stokes mortars and 1-pounders, while the Artillery and tanks may carry on their tactical training with Infantry by staging firing problems without in any way interfering with the operations of the other arms.

Accuracy in the use of the various Infantry weapons having been attained the ground permits the simultaneous staging of field firing exercises in great number.

The war with Germany has in no way decreased the importance of the rifle and rifle training. The rifle is still the premier weapon of the soldier. All men armed with the rifle and all replacements should be trained to effective use of the rifle.

Proper training in rifle firing requires skilled instructors. A system for producing skilled instructors, and the best methods of training the individual must be developed. This system and these methods must be uniform throughout the Army for all organizations and replacements alike. The most efficient method of assuring this is to train at a central school a large number of instructors who, upon joining their organizations, can be utilized to insure proper and uniform methods of training.

One important lesson of the war with Germany was the need of trained officers to act as instructors, and an appreciation of the time and facilities necessary for their training. For the training of large numbers of Infantry officers in technique (which includes marksmanship) and in tactics (which includes musketry) a plant such as was, on the signing of the armistice, under development at Camp Benning must be provided.

Machine-gun training.—Machine-gun instruction in the United States at the outbreak of the war in 1914 was centered at the School of Musketry, Fort Sill, Okla. This school was equipped for the handling of small classes, and after our entry into the war was expanded into the Infantry School of Arms.

The importance of machine guns at that time was not generally appreciated in the United States. As the war progressed, and before the United States entered the war, the importance of machine

guns became more apparent, the number of students at Fort Sill was increased and auxiliary training schools were established in the concentration camps on the Mexican border, the largest school being at Harlingen, Tex.

Due to the development in the service of a broader understanding of machine gunnery, the machine gun department of the school at Fort Sill concentrated its work on modern water-cooled machine guns and on war born methods of fire direction and control. When the United States entered the war this school was equipped for its task of instructing the training staffs of the several divisions. The number of machine guns in our Army was increased by the addition of one battalion of four companies for each brigade and one motorized battalion of two companies for each division. Our pre-war strength had been one company of 12 guns for each regiment.

From each of the divisions, officers of machine gun units were selected and sent to the school at Fort Sill. They were trained intensively for three months and then returned to their divisions to act as instructors of other machine-gun officers in the division schools.

The process was thorough but too slow. It became evident that machine-gun officers and men must be assembled at a training center and receive their instruction at first hand from the few capable instructors available in our Army. The other Infantry weapons were at this time demanding increased areas at Fort Sill and the Field Artillery School at Fort Sill was also expanding to such an extent that it was evident that the additional space needed for machine-gun training could not be provided at that place.

After examination of a large number of sites for a machine-gun school, one was chosen at Camp Hancock near Augusta, Ga., for a machine-gun training center. The machine-gun department of the school at Fort Sill was transferred to Camp Hancock in June, 1918.

The machine-gun training center at Camp Hancock was organized and functioned as follows:

(a) Central Machine Gun Officers' Training School for the training of candidates for commission as first or second lieutenants in machine-gun units.

(b) Machine Gun School for the further training of graduates of the Central Machine Gun Officers' Training School and for officers detailed for machine-gun work above the grade of lieutenant.

(c) Main training depot for the training of oversea replacements and the training of nuclei of machine gunners for new divisions.

After the signing of the armistice, the training center was closed and, as a measure of economy, transferred to the Infantry School at Camp Benning, Columbus, Ga.

Field Artillery Training.—The prewar training of Field Artillery consisted of the yearly courses of instruction of the regular units at their various stations under instructions promulgated by the War Department; instruction of National Guard units under the national defense act; courses at the School of Fire for Field Artillery at Fort Sill, Okla., for Regular officers; and shorter courses at the same school for National Guard officers. Other training activities consisted of courses for regular noncommissioned officers at the School

of Fire; and courses at other points for horseshoers, mechanics, saddlers and farriers. One Field Artillery Reserve Officers' Training Corps unit was well established at Yale University prior to the outbreak of war. This whole training system, founded on a small permanent establishment and a partially organized National Guard, was entirely inadequate for training the large force of Field Artillery called for by the demands of the war.

In April, 1917, the Field Artillery of the United States consisted of 9 regiments of Regular Field Artillery, approximately 16 regiments of National Guard, and a reserve of 221 officers and 33 enlisted men. The trained Regular Field Artillery on April 6, 1917, that is, officers and enlisted men with more than one year's service, was 275 officers and 5,253 enlisted men.

The strength of the Field Artillery on November 11, 1918, was 22,393 officers and 439,760 enlisted men.

This enormous expansion was aided by the conversion of 8 regiments of Regular Cavalry and 15 regiments of National Army Cavalry into Field Artillery regiments and trench mortar batteries and in addition by the temporary transfer of a number of Cavalry and Coast Artillery officers to the Field Artillery.

The School of Fire for Field Artillery at Fort Sill, Okla., was reopened in July, 1917, with a class of about 60 officers. This school had been discontinued after the spring of 1916, on account of the need of all personnel on the Mexican border. The formation of the National Army divisions in August, 1917, took away much of the instructor and student personnel; nevertheless, largely expanded in every respect, the school got into efficient running order by the fall of 1917, and into full swing by the spring of 1918. A proportion of the officers of all brigades attended the course before leaving the United States, depending upon the date of their departure for France. Until the spring of 1918, training of officers consisted of the short courses at various training camps, training with their units in the divisions, and a course at the School of Fire for some. This school trained some 6,000 officers, who upon graduation were assigned to various Field Artillery activities.

In the spring of 1918, brigades were not being efficiently trained in divisional cantonments. This condition arose from lack of matériel, lack of sufficient and efficient instructors, and lack of training area. To meet this condition four brigade firing centers were organized, being located at Camp Doniphan, Okla., Camp Jackson, S. C., Camp McClellan, Ala., and Camp Knox, Ky.

Matériel and instructors were concentrated at these camps. Staff schools and schools for all specialists were concentrated. Officers returning from abroad were detailed as instructors and the services of officers from the foreign missions were utilized.

Those brigades which passed through the firing centers were trained and organized, upon their departure from this country for France, to the extent which should have been expected in the limited time available. Fourteen brigades were trained at these centers.

In the 17 National Army Field Artillery brigades organized in August, 1917, the brigade commanders and senior field officers (one, or two, and rarely three per regiment), were detailed from the Regular Army. Officers from the Reserve Corps and officers' training camps made up the remainder of the commissioned personnel.

The enlisted personnel of these brigades was composed almost entirely of men brought into the service by the draft act. These units developed in the face of the most discouraging handicaps, such as lack of material with which to train, and the more serious handicap of being called upon to build up the National Guard units by the transfer of partially trained men which resulted in a disorganization of the training of the National Army units, and continued a serious drawback to this training and to the development of the units until the establishment of Field Artillery replacement depots, from which replacements were drawn for organizations at home and abroad.

Approximately 20 per cent of the trained Field Artillery officers left for France with the first expeditionary force; this further rendered the task of training the great amount of Field Artillery needed more difficult.

Due to the conditions described above, at the beginning of the year 1918, the training of the Field Artillery was not satisfactory.

On February 10, 1918, the office of the Chief of Field Artillery was created. The beneficial results on training were immediate and from the outset more than justified the creation of the office in question.

The following projects contributed toward the efficiency of the training of Field Artillery:

(a) The organization and enlargement of the School of Fire for Field Artillery at Fort Sill, Okla.

(b) The organization of the Central Officers' Training School for Field Artillery at Camp Zachary Taylor, Ky.

(c) The establishment of schools to train officers in the following specialist subjects: Staff work; aerial observation; radio work; motors and tractors; telephone; liaison; orientation.

(d) The establishment of schools for the instruction of specialists, and the development of motor mechanics and chauffeurs.

(e) The redistribution of matériel along equitable and efficient lines.

(f) The establishment of a system of training and coordination through inspector-instructors, who both inspected and helped in the training of brigades.

(g) The organization of brigade firing centers for the completion of Field Artillery training up to the stage of readiness for taking up combined training of the different arms.

(h) Establishment of the Field Artillery Replacement Depot at Camp Jackson, S. C., and later the establishment of a similar depot at Camp Zachary Taylor, Ky.

Cavalry training.—Experience gained during the Civil War and the many years of campaign on our western frontier and also along the Mexican border resulted in the development of the training of our Cavalry along lines somewhat different from those followed by European cavalry. The lance was discarded long ago by us and that typical American weapon, the pistol, is carried by all cavalrymen. Stress was laid by our Cavalry on training for dismounted action, and since the adoption of the Springfield magazine rifle of 1903 the men have been armed with the same rifle as that of our Infantry. The saber has continued to be one of the cavalryman's

weapons, but the arme blanche never has been a favorite American weapon.

Advantage was taken of the opportunity presented in 1916 when large forces of our Cavalry were in Mexico to develop an improved method of training in mounted pistol firing, and much time was also devoted to training in field firing exercises with the rifle.

The Mounted Service School at Fort Riley, Kans., trained large numbers of officers in modern methods of horsemanship, and these officers carried the doctrine of that school to their regiments and became the instructors of their brother officers.

For a number of years most of our Cavalry has been on duty in the field in the varied country along the Mexican border from the Pacific Ocean to the Gulf of Mexico; their everyday work has been a constant training in the field conditions of mounted troops, and this continued during the war.

In April, 1917, the Cavalry consisted of 17 regiments, of which 3 regiments and 1 squadron were on duty outside of the continental limits of the United States. Some Cavalry accompanied the first of our expeditionary forces to Europe in May, 1917, and later on four regiments of Cavalry were sent to France.

Eight new regiments of Regular Cavalry were organized in May, 1917, and in July of that year, when it was thought that great forces of Cavalry could not be utilized in France under the conditions of trench warfare then existing, these eight new Cavalry regiments were transformed for the period of the war into eight regiments of Field Artillery, were trained as artillery, assigned to divisions, and accompanied their divisions to France.

After the return of the expeditionary forces from Mexico early in 1917, a provisional Cavalry division for drill and maneuvering purposes was organized at El Paso, Tex.

Late in 1917, it being considered that increased numbers of Cavalry would be necessary in the operations on the western front, the Fifteenth Cavalry Division was organized in the United States, and included nine of the Regular Cavalry regiments; about the same time, in order to provide the necessary corps Cavalry and forces for border duty, 15 new regiments of National Army Cavalry were organized, and began their training under Regular officers who were assigned to command them.

Later the Cavalry division was disbanded and in August, 1918, when the new divisions were organized the 15 regiments of National Army Cavalry were transformed into 30 regiments of Field Artillery and 15 trench mortar batteries, the 30 regiments including 17 regiments 3-inch guns horsed, 9 regiments 6-inch howitzers, 1 regiment 4.7-inch howitzers, 1 regiment 6-inch guns, and 2 regiments 3-inch guns motorized.

A training camp for Cavalry officer candidates was inaugurated at Fort Bliss, Tex., and later on a Cavalry Training School for officer candidates, noncommissioned officers, and specialists, was established at Leon Springs, Tex. Numbers of cavalry officers attended the Infantry School of Arms and the School of Fire for Field Artillery as students and both schools included Cavalry officers in their corps of instructors.

When the 15 regiments of National Army Cavalry were transformed into Field Artillery, six National Guard regiments in the

State of Texas were partially organized and could have been called into service. The officers from these regiments were sent to the Central Cavalry School at Leon Springs, Tex. It was planned at this time to organize five more regiments of National Army Cavalry, the officers for which regiments were to be assembled at the Cavalry School at Leon Springs for training, the intention being to have organized and trained by April 1, 1919, a Regular Cavalry division of nine regiments for foreign service, and a sufficient force to care for the needs of the Mexican border.

Training of special services and corps.—The details of the training of the various special services and corps will not be considered in this report, as these matters will undoubtedly be covered in the report of the respective chiefs of services, under whom this training was conducted subject to the general control of the General Staff.

COMMITTEE ON EDUCATION AND SPECIAL TRAINING.

On February 10, 1918, there was created within the War Department, "The Committee on Education and Special Training," the functions of that committee being to study the needs of the various branches of the service for skilled men and technicians; to determine how such needs were to be met, whether by selective draft, special training in educational institutions, or otherwise; to secure the cooperation of the educational institutions of the country, and to represent the War Department in its relations with such institutions; and to administer such plan of special training in colleges and schools as might be adopted. This committee consisted of officers of the Army and associated with it was an advisory civilian board, members or representatives of educational institutions. The chief of each staff corps and department was directed to detail an officer to consult with the committee concerning the needs of his corps or department.

National Army training detachments.—The Committee on Education and Special Training was primarily organized for the purpose of providing for the training of technicians and mechanics to meet the Army needs. This was accomplished by the organization of National Army training detachments at technical schools and colleges throughout the country. Men were obtained for these detachments by voluntary induction and were sent direct from the draft boards to the educational institutions. By November 11, 1918, about 140,000 men were given technical training in 141 educational institutions. This training was started during April, 1918, and at the time of the armistice 102,000 men had completed their training and had been assigned to organizations for technical service. Thirty-eight thousand were still in training.

Students' Army Training Corps.—During the summer of 1918 a serious shortage of officer material developed as supplied by the usual agencies. The draft law increasing the age limits endangered still further the supply of officer material. As material for junior officers had been supplied very largely from college graduates and undergraduates, it was felt that this source of supply must be preserved. Therefore, orders of August 24, 1918, provided for the raising and maintaining by voluntary induction and drafting a Students' Army Training Corps, units of this corps to be authorized at educational institutions which met the prescribed requirements.

On October 1, 1918, regularly enrolled students in the higher educational institutions were voluntarily inducted into the service at the institutions and formed into Students' Army Training Corps units. The Students' Army Training Corps thus organized was divided into two sections, the Vocational Section which absorbed the National Army training detachments and the Collegiate Section composed of regularly enrolled college students. These units were maintained at the institutions at Government expense and 527 contracts were entered into with as many institutions. The Students' Army Training Corps was demobilized as soon as possible after the armistice of November 11, 1918. One hundred and fifty-eight thousand students were enrolled in the Students' Army Training Corps. At the time of the armistice 11,000 men had already been appointed to officers' training camps, and 4,000 more had just been designated to proceed to such camps.

The Students' Army Training Corps units were composed of enlisted men in the service of the United States, and as such had equal privileges for attendance at officers' training schools with the enlisted men in Army cantonments. If members of the Students' Army Training Corps attained the proper standard for entrance into an officers' training school, they were to be recommended therefor; otherwise, they were to be assigned to organizations for duty as non-commissioned officers or privates.

Experience developed great difficulty in securing the proper number of qualified candidates for the officers' training schools, and with the greatly enlarged military program this difficulty threatened to become acute. The military program called for the organization of 98 divisions by July 1, 1919, 80 of which were to be abroad in October, 1918. It was estimated that 150,000 additional officers would be needed before July 1, 1919. On the basis of previous experience, about 65 per cent of those entering the officers' training schools won commissions. This, therefore, meant that officer candidate material had to be provided to a number of not less than 200,000. High standards had to be maintained and careful selection made of all available material to provide this number. The Students' Army Training Corps provided a method by which men having a certain preliminary educational training might be brought together in relatively small groups, where they would be under direct observation. It provided a careful method of testing and selecting officer candidates for the line of the Army. It also made possible the selection of technical experts, such as medical officers, engineers, quartermaster officers, ordnance officers, and large numbers of technically qualified enlisted men who had proved to be indispensably necessary in modern warfare. The Collegiate Section was open to men from all walks of life who met a prescribed educational standard; that is, the equivalent to graduation from high school. The Vocational Section was open to men in all walks of life who had a grammar-school education or equivalent trade or business experience.

It was proposed to keep the units of the Students' Army Training Corps at all times at their normal strength. Therefore, as members of the corps were transferred for duty at officers' training schools, noncommissioned officers' schools, or to other organizations, their

places were to be taken by enlisted men selected from the Army cantonments, or by men inducted into the service from civil life.

The Students' Army Training Corps did not provide either exemption or deferment for any favored class. The bulk of the men inducted into the Students' Army Training Corps were to be assigned to duty in the field at the same time with other men of their age who were not in the Students' Army Training Corps. Furthermore, many men were to be assigned to such duty at an earlier date than would have been the case had they not joined the Students' Army Training Corps, since they anticipated their draft and rendered themselves immediately liable to such transfers and assignments as the needs of the service might require.

The provision that members of the Students' Army Training Corps should be on active duty status, and therefore housed, messed, and instructed at the expense of the Government, entirely removed discrimination against the poor man. It opened the best educational institutions of the country, many of which had hitherto been mainly accessible only to the sons of well-to-do parents, to all young men who had the necessary educational qualifications.

On June 3, 1918, three Reserve Officers' Training Corps camps were inaugurated at Plattsburg Barracks, N. Y., Fort Sheridan, Ill., and the Presidio of San Francisco, Calif. Six thousand five hundred students attended these camps, but none were commissioned upon their termination. These camps were continued from July 16 to September 18, 1918, for the Students' Army Training Corps and on September 15, 1918, 3,264 lieutenants of Infantry were commissioned; 597 officers of Artillery were also commissioned, but they are included in the total graduates from the Field Artillery central officers' training schools, where they had been sent for further training.

Reserve Officers' Training Corps.—Upon the demobilization of the Students' Army Training Corps, which relieved the Committee on Education and Special Training of most of its functions, the re-establishment and development of the Reserve Officers' Training Corps was taken up as the chief function of the committee.

A "Reserve Officers' Training Corps Branch" was created in the War Plans Division on August 29, 1919, the duties of that branch being to supervise, direct, and control affairs relating to the Reserve Officers' Training Corps, and the Committee on Education and Special Training ceased to exist.

SYSTEM OF MILITARY EDUCATION.

The system of military education for the Army has been given careful study with the view of making such modifications as might be dictated by the experience gained during the war. Under the present approved plans it is contemplated that the system of military education in the Regular Army will embrace:

For officers: (a) Basic schools; (b) unit officers' schools; (c) special service schools; (d) general service schools.

For cadets: (a) The United States Military Academy.

For enlisted men: (a) Post schools; (b) unit noncommissioned officers' schools; (c) special service schools.

The basic schools for officers have for their object to qualify by systematic and standardized methods of training all officers, upon

initial entry into the service, in order that they may function intelligently on being assigned to duty with their arm or service. Basic schools, for each arm or service, in general, will be located at one of the corresponding special service schools. Specifically, these schools replace the regular course of the old garrison schools. The school term of all basic schools will be the same.

The primary object of the unit officers' schools is the instruction and training of officers of all grades with a view to the proper training of troops of their commands. The secondary object is to continue the progressive development of the technical and tactical education of all officers. The primary object demands that these schools be conducted concurrently with the training of the troops and that the courses of instruction be definitely and closely coordinated with the schedules for troop training, in order to carry out efficiently the training schedule in progress and to coordinate training in different units of the same command. The secondary object demands that instruction in theory and practice in the tactics of the combined arms and services be given, in order to prepare officers for the course at the School of the Line and to continue their training after each period of absence from normal duty. Such theoretical work as may be required in accomplishing the above objects, will be developed through the applicatory methods of instruction.

The object of the special service schools is to develop and standardize the training of officers in the technique and tactics of their respective arms or service. It is contemplated that an officers' special service school will be established for each of the arms and services as follows: (*a*) The Infantry; (*b*) the Cavalry; (*c*) the Field Artillery; (*d*) the Coast Artillery Corps; (*e*) the Engineer Corps; (*f*) the Signal Corps; (*g*) the Air Service; (*h*) the Tank Corps; (*i*) the Ordnance Department; (*j*) the Medical Corps; (*k*) the Motor Transport Corps; (*l*) such other special service schools as may be hereafter authorized.

While the primary object of the above schools is the training and development of officers in the technique and tactics of their own arm or service, in order to avoid duplication of effort and to insure dissemination of correct doctrine and methods, each of these will have the function of training officers in specialties which are also common to other arms or services. These schools shall be open, therefore, to officers of all arms, services, and grades according to the necessities of the service.

The object of the general service schools is to train officers in the tactics of the combined arms, for the General Staff and for high command. They comprise the following: (*a*) The School of the Line; (*b*) the General Staff School; (*c*) the General Staff College.

The object of the School of the Line is to train officers of all arms in the combined use of all arms and services functioning with a division, including the functioning of corps and army troops and services in their relation to the division, and in the duties and responsibilities of field officers with regard to education and training in the Army.

The object of the General Staff School is to train selected officers for duty as General Staff officers with tactical units and for higher command. In addition, it will conduct special courses for general

officers and officers of the technical and administrative services. Graduates of the General Staff School specifically recommended by the commandant for instruction at the General Staff College will be placed on the eligible list for this detail.

The object of the General Staff College is to train selected officers for duty in the General Staff Corps and for high command. In addition it will conduct special courses for general officers and selected officers of the technical and administrative services.

The object of the post schools is to teach enlisted men in the common branches of education and to give them vocational training. These schools are established at every garrisoned post or station.

The primary object of the unit noncommissioned officers' schools is to prepare noncommissioned officers on duty with troops to carry out efficiently the training schedule in progress and to coordinate the training in the different units of the same command. The secondary object is to continue the progressive development of the technical and tactical education of all noncommissioned officers. These schools are conducted at every garrisoned post or station and the attendance of all noncommissioned officers on duty with combat and technical units thereat is mandatory.

The object of the special service schools for noncommissioned officers is to train certain noncommissioned officers and enlisted specialists in the technique and duties of their arm or service in accordance with their respective needs.

IV. MILITARY INTELLIGENCE DIVISION.

NEGLECT OF MILITARY INTELLIGENCE.

Prior to our declaration of war with Germany this essential general staff agency which is charged with gathering, collating, and disseminating the military information necessary as a basis for correct military decisions existed only in a rudimentary form. In April, 1917, it consisted of a section of the War College Division, comprising a total personnel consisting of two officers and two clerks and supplied with only \$11,000 by congressional appropriation for the performance of a duty vital to the interests of the Army and the Nation. Every other army of importance was provided with a far-reaching military intelligence service directed by a well-equipped general staff agency recognized as on a par with the agencies charged with military plans, operations, and supplies. As a result of our neglect of this service, the valuable information gathered by the officers whom we had attached to European armies during the first two years and a half of the war was never properly used. We were also without accurate data as to the powerful and insidious espionage, propaganda, and sabotage methods with which Germany at once attempted to thwart our military effort.

ORGANIZATION OF MILITARY INTELLIGENCE DIVISION.

On July 1, 1918, the Military Intelligence Section, War College Division, General Staff, had been reorganized as the Military Intelligence Branch, Executive Division, General Staff, and consisted of 173 officers, 23 noncommissioned officers, and 589 clerks in Washing-

ton, as well as representatives in the more important cities of the United States, in all important foreign countries, and an extensive field force made up of specially chosen and instructed personnel in each military unit at home and overseas. This service had already rendered Gen. Pershing great assistance by supplying him with the required intelligence funds, with competent, loyal interpreters, agents, code and cipher experts, and other special intelligence personnel, and with the material peculiarly adapted for intelligence needs.

The staff reorganization, effected by General Orders, No. 80, War Department, August 26, 1918, made the Military Intelligence Service a coordinate division of the General Staff and placed it on a par with similar services of general staffs of other nations of the world. The additional authority and prestige thus provided made it possible for this division to deal with other governmental agencies and with the intelligence services of our allies much more expeditiously and effectively than was possible under the previous imperfect organization. At the time of the armistice the Military Intelligence Division in Washington was made up of a highly specialized personnel consisting of 282 officers, 29 noncommissioned officers, and 948 civilian employees, the field force had been greatly improved and enlarged, the assistance furnished the intelligence section of Gen. Pershing's staff was becoming daily more direct and more valuable, as was the cooperation with the State Department, the Treasury Department, the Department of Justice, the Post Office Department, Naval Intelligence, the War Trade Board, the War Industries Board, and the National Research Council.

Since the signing of the armistice the Military Intelligence Division, in spite of the necessary rapid demobilization of its civilian and temporary commissioned personnel, has contributed much valuable information to the American commission to negotiate peace, for which over 20 officer-specialists were furnished, and with which was effectively linked the military attaché system and the intelligence service of the American Expeditionary Forces. Investigation of alleged cases of enemy activity and disloyalty within the civil population in the United States which had been necessary during the period of actual hostilities terminated on November 30, 1918, but the enormous financial interests of the United States involved in the cancellation of war contracts and the salvage of surplus stores has made necessary the continuance of a small bureau in this division for the investigation of alleged graft and fraud in connection with such matters. The gathering and effective use of military information is, however, held to be the primary function of the Military Intelligence Division in time of peace; and it is upon this principle that the business of this division is now being conducted.

The duties assigned to the Military Intelligence Division by General Orders, No. 80, War Department, 1918, are:

This division shall have the cognizance and control of military intelligence, both positive and negative, and shall be in charge of an officer designated as the Director of Military Intelligence, who will be an assistant to the Chief of Staff. He is also the chief military censor. The duties of this division are to maintain estimates revised daily of the military situation, the economic situation, and of such other matters as the Chief of Staff may direct, and to collect, collate, and disseminate military intelligence. It will cooperate with the intelligence section of the general staffs of allied countries in connection with military intelligence; prepare instructions in military intelligence work for the

use of our forces; supervise the training of personnel for intelligence work; organize, direct, and coordinate the intelligence service; supervise the duties of military attachés; communicate direct with department intelligence officers and intelligence officers at posts, camps, and stations, and with commands in the field in matters relating to military intelligence; obtain, reproduce, and issue maps; translate foreign documents; disburse and account for intelligence funds; cooperate with the censorship board and with intelligence agencies of other departments of the Government.

In order to perform the duties thus assigned it the Military Intelligence Division has been organized into an Administrative Section and 12 other sections, grouped according to the nature of their functions into three branches. Positive, Geographic, and Negative. The magnitude, importance, and variety of the work of this division can best be shown by a summary of the activities of its various subdivisions.

Administrative Section (M. I. 1).—Due to the confidential character of the greater portion of intelligence work and the need of speed in the transaction of daily business, a considerable amount of decentralization in the matter of direct communication, money accounts, and the custody of intelligence records has been authorized. This has placed a great burden on this section, which administers the affairs not only of the office in Washington but of branch offices in nearly every part of the world.

Nearly 500,000 cases have been investigated since the declaration of war. In a large proportion of these cases the Department of Justice, Naval Intelligence, State Department, and War Trade Board were interested. The system necessary to preserve the confidential character of the records of such cases and at the same time to provide for a proper interdepartmental exchange of information and the rapid handling essential to effective investigation or prosecution has been perfected from time to time and is now in a satisfactory condition; but it is believed that steps should be taken in the interest of economy and efficiency to provide for a central registry system for all governmental agencies charged with investigations of this character which should be put into operation as soon as war is again declared.

In addition to the usual duties of such an agency, the personnel subsection was charged with the important duty of recruiting the Corps of Interpreters and the Corps of Intelligence Police. A high standard of loyalty and discretion was maintained in both these organizations; and in the Corps of Interpreters a comprehensive knowledge of both spoken and written French and German was required before an applicant was recommended for appointment. Commissioned intelligence personnel for general intelligence purposes was selected after the most searching investigation and with particular regard for the special knowledge or ability required, but no officers were assigned to combat intelligence duty with troops who had not received previous military training. The efficiency of the intelligence service as a whole was largely due to the high standard of ability, integrity, and discretion set by this section.

MILITARY INTELLIGENCE DIVISION PUBLICATIONS.

The administrative section was also charged with editing and publishing the various intelligence publications authorized from time to time. It was well equipped for photographic and litho-

graphic reproduction and, during the war, maintained a separate printing plant. Over 30,000 photostatic and 15,000 photographic reproductions of intelligence documents were made during the fiscal year. The following publications were issued:

The Daily Intelligence Summary.—This was a confidential bulletin containing a résumé of the military situation throughout the world as well as the political and economic conditions bearing on the war. The summary was based on information received during the preceding 24 hours. It was distributed throughout the military service and to the State Department and other cooperating agencies. Due to a reduction in clerical personnel publication was discontinued on June 30, 1919.

The Weekly Intelligence Summary.—This summary has a more restricted distribution than the Daily Summary by reason of the fact that the estimate of the international situation is based upon information often received through diplomatic channels or furnished confidentially by allied intelligence services. Information is furnished bearing on world politics in which the United States has an interest, the increase or modification of military establishments and the territories occupied by the enemy. The Summary is composed of three parts as follows:

(a) Military; strategic surveys covering all fronts and military phases of importance in various belligerent countries.

(b) Political; salient political factors bearing on the general strategic situation, and surveys of political, ethnic, and psychologic factors pertaining to the internal situation of various countries. Mexico, as a unit, was included under this heading.

(c) Economic and social; surveys of the economic situation in the various countries relating to the general strategic situation.

Since the signing of the armistice, the Summary has become rather an interpretation of the more significant news of the week rather than a mere record of news items.

The Work and Activities of the Military Intelligence Division.—This was a weekly report recording in chronological order all the activities of the division for the confidential information of all intelligence officers and coordinate branches of the War Department. It has been discontinued, but served a useful purpose during the period of hostilities.

THE POSITIVE BRANCH.

This branch is charged with the collection, evaluation, collation, and dissemination of all information except that recorded in maps, military monographs, and handbooks, with the compilation and study of codes and ciphers and with all the translation for the War Department. It is composed of the following sections:

Information Section (M. I. 2).—*The strategic estimate.*—The primary function of this section is to weigh and digest information, to interpret it and to prepare the result in such a form that it will be readily available at the time and place needed. Information, no matter how good, which is not made ready to use is without military value. The principal product of this section is a confidential work known as the Current Estimate of the Strategic Situation. This estimate is prepared in loose-leaf form in bound volumes distributed

throughout the General Staff, the State Department, and our forces abroad. It is arranged geographically, and is based on the principle that, for each country in the world, the General Staff should be prepared to answer two questions: "What is the situation to-day?" and "What is it going to be to-morrow?" Since no military situation is known in a comprehensive manner unless the political, economic, and psychologic situations bearing upon it are also known, the situation in each country is discussed under four heads: Military, political, economic, and psychological. These estimates form a current monograph of the world and have been of great use to the State Department. The interior organization of this section now corresponds geographically to that of the divisions of the State Department, and the cooperation between the two services is improving daily.

Collection Section (M. I. 5).—Military attachés.—This section is charged with the selection and instruction of military attachés, their assistants and clerical force, and with the detailed administration of the military attaché system. Until the organization of this section in February, 1918, we had greatly neglected the opportunity for the systematic gathering of information furnished by a well-chosen and well-administered corps of military attachés. Our choice of attachés had been haphazard, and the supervision and support given them had often been spasmodic. We are now, however, already able to select better officers, to train them before sending them to their posts, to utilize, advise, and support them while on this important duty, and to see that their acquaintance with the countries to which they have been accredited is made use of after their relief and return to this country. It is hoped that a continuation and perfection of the present system will put this country on a par with other countries in this respect, and that there will be evolved a considerable corps of officers having detailed knowledge of the language, military establishments, political conditions and customs of foreign nations. The proper type of officer should be encouraged to prepare himself for duty of this kind by travel and the study of foreign languages. Military attachés are now maintained at 33 foreign capitals.

During the war, in addition to the gathering of positive information, our military attachés cooperated successfully with our naval attachés in the exceedingly important duty involved in contraspy duty abroad, and those in countries contiguous to Germany were able to furnish the American Expeditionary Forces with valuable and timely combat information procurable in no other way. For this purpose direct communication between attachés and our forces was provided.

By a special system of filing and indexing, the information obtained by this section is at once furnished to the Information Section (M. I. 2), and the many and varied technical reports on military organization, equipment, and methods submitted by military attachés are promptly sent to all interested War Department agencies and to all other appropriate Government departments. The cooperation of the National Research Council has been of much value in perfecting this system.

Translation Section (M. I. 6).—All War Department translation has been consolidated in this section which, during the fiscal year, has translated 60 technical documents from 7 foreign languages, all

the "suspect lists" furnished by the French and Italian intelligence services, 1,438 letters in 31 different languages, as well as 3,562 citations of American officers and men. In addition, 38 foreign daily papers in 10 different languages from 13 different countries are read and the important parts extracted for the other sections of the division and for the Historical Branch of the War Plans Division. The personnel of this section is competent to translate 19 foreign languages; and, by utilizing the services of temporary personnel, 17 additional languages can be translated. Thirty-nine Government offices habitually make use of the services of this section.

In addition to the actual preparation of translations this section has been charged with the preparation of valuable glossaries of the new terms and abbreviations evolved during the war.

Code and Cipher Section (M. I. 8).—Codes and ciphers.—The work of this section concerned an important field of endeavor which, before the war with Germany, was almost entirely unknown to the War Department or to the Government of the United States as a whole. Early in 1917 it was realized not only that secret means of communication were essential to the successful prosecution of the war, but also that, in order to combat the means employed by a skillful and crafty enemy, a War Department agency was required in order to make an exhaustive study of this complicated subject and to put to practical use the results of such study. As finally developed this section comprised five bureaus, as follows:

The Shorthand Bureau.—Organized in response to demands which came chiefly through cooperation with the postal censorship because of the fact that it was almost impossible for examiners to discriminate between unusual shorthand systems and cipher, this bureau was in a few months able to transcribe documents written in some 300 shorthand systems in 7 different languages.

Secret Ink Bureau.—By direct liaison with the French and British intelligence services, this bureau built up a useful fund of knowledge covering this hitherto little-known science which is at once so useful and so dangerous. Over 50 important secret-ink spy letters were discovered which led to many arrests and prevented much enemy activity. Prior to the lifting of the postal censorship an average of over 2,000 letters per week were tested for secret inks.

Code Instruction Bureau.—This bureau provided the necessary practical instruction in codes and ciphers given to prospective military attachés, their assistants and clerks, and to officers and clerical personnel designated for duty in similar work in the American Expeditionary Forces in France and Siberia.

Code Compilation Bureau.—The 1915 War Department code soon fell into the hands of the enemy, and this bureau was required to compile Military Intelligence Code No. 5 which succeeded it, as well as two geographical codes specially adapted to the sending of combat information from France. A casualty code, designed to save errors and time in connection with the reporting of battle casualties was commenced in September, 1918. It was not published on account of the signing of the armistice, but the work on it is complete and available for future use.

Communication Bureau.—This bureau was the nerve center of a vast communication system covering the habitable globe. By special

wire connections and a 24-hour service maintained by skillful and devoted operators exceptionally fast and confidential communication was established with all important news centers at home and abroad. Messages from Paris have been received and decoded within 20 minutes after sending; and the average time necessary to communicate with Vladivostok and Archangel was less than 24 hours. From September, 1918, to May, 1919, this bureau sent and received 25,000 messages containing 1,300,000 words.

Combat Intelligence Instruction Section (M. I. 9).—Until June, 1918, it had not been possible to coordinate the instruction of field intelligence officers on duty with combat divisions in the United States with similar instruction given in France. In cooperation with the Training Branch of the War Plans Division, there was at that time initiated a comprehensive training project based on the principle that divisional intelligence officers in the United States should be appointed only from officers who had qualified in the work in France. The training program involved was issued to troops as Training Circular No. 21, published by the War Plans Division. At the date of the signing of the armistice this program had been completed in nine divisions. An inspection of the intelligence groups of four divisions indicated that the program was based on sound principles and that the groups were as nearly ready for combat duty as was possible without actual combat experience. It is essential that training in combat intelligence be continued in time of peace; and special courses in this work have been included in the projects for the service schools of the future. This section of the Military Intelligence Division ceased its active functions upon the demobilization of the combat divisions in the United States and the designation M.I.9 was applied to the Monograph Section of the Geographic Branch.

THE GEOGRAPHIC BRANCH.

This branch of the Military Intelligence Division, which is charged with the direction of the War Department policy with respect to maps of foreign countries, with military monographs and handbooks and with the custody of the General Staff map collection was formerly included in the Positive Branch, but its activities have recently become so specialized that on April 24, 1919, it was deemed expedient to group the Map Section and the Military Monograph Sections into a separate organization.

Map Section (M. I. 7).—*Maps.*—This section is charged with the custody of the foreign map collection of the War Department, with the procurement and issue of all foreign maps, and with the compilation of map information procured by M. I. D. The map collection now filed and indexed consists of over 300,000 sheets, and is being augmented daily, numerous additions having recently been received from the American Expeditionary Forces. With the maps still to be received as a result of America's participation in the late war, it is believed that within the coming year the collection will aggregate almost 1,000,000 sheets. Normal accessions during the fiscal year numbered about 15,700, or over 1,200 maps per month. This accession included occasional maps from all parts of the world, and some very valuable foreign sets of maps, included in which may be mentioned French, English, Italian, Russian, and Austrian staff maps of large

scale. Photographs and photographic map reproductions occupied a considerable part of the personnel during the fiscal year, resulting in the production of 18,000 prints and enlargements, 43,000 photostat prints, and almost 1,000 lantern slides.

This section furnished numerous maps to the American Expeditionary Forces in France, Russia, and Siberia, and was instrumental in supplying the Military Academy, training centers, and other military educational institutions with originals and reproductions of foreign war maps. The activities of M. I. 7 were not wholly limited to the Military Establishment, but it has been the means of supplying the War Trade Board, the Shipping Board, the Alien Property Custodian, the State Department, and the American Red Cross with map information.

Monograph Section (M. I. 9) — Handbooks. — This section is charged with the production of military monographs and handbooks of routes in selected foreign countries. During the fiscal year it has produced in printed form 10 complete handbooks, has completed 5 others which are either ready for printing or are being printed at the time this report is written. The majority of these handbooks treat of conditions in Siberia, Russia, and Poland, and were prepared for the use of our forces had penetration in the regions above mentioned been carried out. The later productions of the section consist entirely of handbooks on Mexico, of which one is in the hands of the printer, two are undergoing final revision, and others are being rapidly assembled and should be ready for final revision and printing within approximately two months.

A number of radical changes in the methods of collating and presenting of military information in the shape of monographs and handbooks have been worked out in this section during the fiscal year, chief among which is the line of demarkation between a monograph and a handbook. The handbook is regarded as tactical, presenting as it does detailed information regarding routes, railroads, cities, and terrain, while the monograph is strategic in nature, dealing in a broad manner with resources, economics, characteristics of the people, and many other subjects in which the General Staff of the military administration would be interested but which are only remotely related to the details of the conduct of military operations.

THE NEGATIVE BRANCH.

This branch collects, collates, and disseminates information upon which may be based measures of prevention against activities and influences tending to impair our military efficiency by other than armed force.

The branch was created on August 18, 1918, by uniting four existing sections. The sections so united were the Foreign Influence Section, the Army Section, the News Section, and the Military Morale Section. In September, 1918, the Travel Section and the Fraud Section were added. On October 19, 1918, the Military Morale Section became the Military Morale Branch of the General Staff. The organization at the time of the cessation of hostilities, when the branch had reached its highest point of development, consisted of five sections, as follows: Foreign Influence (M. I. 4); Army (M. I. 3); News (M. I. 10); Travel (M. I. 11); Fraud (M. I. 13).

At its maximum the branch employed the services of 202 officers, 60 enlisted men (Corps of Intelligence Police), 65 volunteers (candidates for commissions), and 605 clerks. It directed the activities of thousands of officers and enlisted men in the field and through this organization did the War Department's share in completely foiling the well-laid plans of the enemy to impede our military program. In addition, this branch effectuated direct savings to the Government which aggregate more than the entire appropriation for Military Intelligence.

A consideration of the functions of the several subdivisions of the branch gives a comprehensive view of its activities, which included the handling of cases during the current year in number closely approximating half a million.

The Foreign Influence Section (M. I. 4) is the present section from which grew the Negative Branch. As delimited by the diversion of specialties to other sections, the duty of this section in general is the study of espionage and propaganda directed against the United States or against its allies, and also the study of the sentiments, publications, and other actions of foreign language and revolutionary groups both here and abroad, in so far as these matters have a bearing upon the military situation. The activities of the section were carried on through seven subsections, as follows:

The Executive Subsection apportioned, supervised and coordinated the work of the section, determined questions of policy and represented the section in its relations with important officials.

The Departmental subsection studied the intelligence situation in the territories embraced within the several geographical military departments of the United States. It investigated enemy espionage and channels of communication, the financing of enemy activities and particular cases of enemy influence.

The Propaganda subsection studied and collated information on dissemination by the enemy of doctrines and false rumors aimed to create confusion of thought and so impair our military efficiency. It also studied and suggested methods for meeting and overcoming this imponderable mode of attack.

The Foreign Subsection studied the intelligence situation abroad and, in cooperation with the corresponding agencies of allied powers, determined the nature and extent of enemy secret activity and formulated methods for overcoming its effect.

The Legal and Liaison Subsection maintained liaison with the various Government agencies in Washington through officers familiar with the various departments. In addition, it systematically studied legislation, enacted or pending, proclamations, executive orders, and legal decisions affecting the Intelligence Service.

The Research Subsection took over from other subsections, cases which appeared to have reached unusual significance or importance, summarized all material information available and prepared such cases for final disposition.

The Labor and Sabotage Subsection handled all matters relating to the prevention or delay of deliveries of war materials by immobilization of resources, control of factories, or raw materials, subversion or intimidation of labor or physical damage to plants or products.

The Army Section (M. I. 3).—The function of this section is the organization, instruction and supervision of the Negative Intelligence Service within the Military Establishment; more specifically it protects the Army by the prevention and detection of enemy and disloyal activity among the military, including civilian personnel under military authority and in volunteer auxiliary associations. It supervises and coordinates the work of the Negative Intelligence officers stationed with each military unit and promulgates instructions for the operation and maintenance of the Negative Intelligence Service in the field.

The Executive Subsection coordinated the work of the section, assigned personnel and issued the bulletins and instructions which determined policy for the field organization. It also handled a variety of special and miscellaneous matters which did not fall within the province of another subsection. Among such specialties were the observation of conscientious objectors and of foreign church organizations and pacifist religious bodies operating among troops. The intelligence problems arising through the presence in the American Army of large bodies of Negro troops were studied in this subsection and much valuable information was secured and digested.

The Line Subsection cooperated with intelligence officers in line units in the field in investigating cases of disloyalty, sedition or enemy activity, either among troops or at points where troops were stationed. It also investigated and reported upon the antecedents and personal character for loyalty and integrity of candidates for commissions in the line of the Army. The duties of this section included not only the observations of dangerous tendencies or incidents arising within military units, but also those which operated from without directly upon the Army personnel.

Three other subsections performed for the technical and administrative corps and departments duties identical with those which the Line Subsection handled for the line of the Army. This work was grouped as follows: (a) General Staff, Judge Advocate General's Office, Adjutant General's Office, Corps of Engineers, Ordnance Department, Quartermaster Corps, and Motor Transport Corps. (b) Medical, Dental, and Veterinary Corps and the Chemical Warfare Service. (c) Signal Corps and Air Service.

The Personnel Subsection served all other subsections by conducting preliminary investigations of candidates for commissions and other persons under investigation, and so eliminated from further consideration all whose character for loyalty and integrity proved to be questionable. This subsection also performed a valuable service in detecting applicants for commissions in technical branches who had previously been rejected or discharged for cause from other branches of the service. One result of the investigations of this group was to prove the utter unreliability of letters of recommendation in estimating the fitness of individuals. Approximately 15,000 cases were handled during the emergency.

The Statistical Subsection, by means of maps and indexes, kept records of all military units in the United States and of the Intelligence organization of each; of the various cooperating agencies and of the status of the field service in general. It had custody of all literature issued by the section and attended to the mailing of cir-

culars, bulletins, and instructions. It coordinated the administrative work of the field and the office. This subsection maintained liaison with statistical offices of other branches of the War Department.

The Instruction Subsection studied the development of the Negative Intelligence system, evolved general principles and specific policies of general application and promulgated the result for the improvement of the service. It developed a well-considered plan for the personal instruction of Negative Intelligence officers, and prior to the signing of the armistice conducted schools for two groups of officers brought in from the field for instruction.

The Plant Protection Bureau.—This was a civilian organization which originated in the Air Service as a measure of protection for the airplane production program. It was taken over by Military Intelligence and its scope enlarged to include the protection of Government plants and construction projects as well as all private plants engaged in war work. This bureau systematically studied and inspected fire risks and made specific recommendations of measures for fire prevention. It organized watch and guard systems for plants engaged in Government work and provided watchmen where necessary. It also devised plans and furnished agents for detecting and preventing sabotage or other malicious interference with the production of war material. Approximately 5,000 plants were under the inspection of this bureau, which employed an operative force of 373 and supervised the activities of thousands of guards and watchmen. Offices were maintained at Boston, Springfield, New Haven, Bridgeport, New York, Albany, Syracuse, Buffalo, Newark, Philadelphia, Baltimore, Nitro, Atlanta, Nashville, Pittsburgh, Cleveland, Dayton, Indianapolis, Detroit, Chicago, Milwaukee, Minneapolis, Davenport, St. Louis, Fort Worth, San Francisco, and Los Angeles.

An important by-product of the activities of this bureau arose from its intimate knowledge of the operation of plants working on Government contracts whereby it was in a position to frustrate false claims and overcharges. No account was kept from which an accurate statement can be made of the total savings effectuated in this way. One item amounted to \$600,000, and the total is estimated as \$2,000,000.

Liaison with the American Protective League.—The American Protective League was a volunteer civilian organization of 300,000 members, operating under the supervision of the Department of Justice, and thoroughly covering the United States. By special arrangement with the Department of Justice this agency of information was placed at the disposal of the Military Intelligence Division, and to facilitate communication directly with the various local branches of the league a Liaison Subsection was created under the direction of an officer of Military Intelligence, who was also an officer of the American Protective League.

The News Section (M. I. 10).—On June 11, 1918, the Director of Military Intelligence was appointed to represent the War Department on the Censorship Board and the work incidental to this additional duty was at first handled in several sections of the Negative Branch. On August 16, 1917, the Director of Military Intelligence assumed the duty of Chief Military Censor and this section, which

was originally called the Censorship Section, was created to handle the increased volume of work entailed.

Censorship.—In practice it was found that much of the organization necessary to examine publications and communications for censoring served equally well for collecting and digesting current news in a manner which proved to be of great value to the War Department. As time progressed these informational functions became more and more important and when, with the close of hostilities, the censorship became unnecessary, this feature of the section, now called the News Section, was continued. At its maximum the section had 15 subsections, as follows:

The Executive Subsection coordinated and supervised the work of the section, handled necessary administrative details, together with miscellaneous matters which did not fall within the province of any other subsection, and maintained liaison with the boards of experts in other departments.

The Legal Subsection advised on the legal aspects of the censorship and recorded the precedents established upon rulings obtained from the staff of technical experts organized in the various bureaus of the War Department to cooperate with the Chief Military Censor.

The Postal Subsection maintained liaison with the Post Office Department and handled those matters which arose through the duties of the Chief Military Censor as War Department member of the Postal Censorship Board.

The Prisoner of War Subsection censored all mail to or from prisoners of war held by the United States in the several war prison camps and coordinated the work in this country with that done abroad.

The Telegraph and Telephone Subsection conducted the censorship of telegraph and telephone messages into Mexico during the period that the regulations were in force.

The Radio Subsection supervised the interception of radio messages originating in Mexico and through this service obtained much invaluable information regarding the activities and intentions of the enemy.

The Official Photograph Subsection censored all official motion and still pictures and made appropriate recommendations to the Signal Corps, the Historical Branch, and the Committee on Public Information.

The Commercial Motion Picture Subsection surveyed the private motion picture field for harmful propaganda or indiscreet revelations and in conjunction with Customs Intelligence censored the importation and exportation of films.

The Photographic Permit Subsection in cooperation with the Committee on Public Information handled the matter of official permits to make photographs on or about military camps and reservations.

The Press Subsection examined newspapers and periodicals to detect violations of the voluntary press censorship, advised the press regarding the suppression of information which might be of military value to the enemy, and attended to the accrediting of war correspondents.

The Foreign Language Press Subsection examined publications in foreign languages published in the United States and foreign language material entering this country.

The Book Subsection examined books, pamphlets, posters and all publications other than newspapers and periodicals, reported on such as were contrary to the interests of the United States, and recommended repressive measures where necessary.

The Propaganda Subsection examined periodicals and publications clearly engaged in propaganda activities for the purpose of ascertaining if their teachings were inimical to the interests of the United States.

The Digest Subsection prepared a daily news summary, a semi-weekly digest of editorial opinion for transmission to France, and a weekly press review for the Secretary of War.

The Clipping Bureau maintained a newspaper and magazine clipping service for all sections of the Military Intelligence Division and several other branches of the General Staff.

Travel Section (M. I. 11).—This section was created on September 23, 1918, by bringing together under one executive head several subsections from other sections. Its function consists of the study of normal travel and the application of the data thus secured to the control of travel into and out of the United States in time of war. From the beginning of the war the State Department relied upon the War Department for advice regarding all doubtful persons who made application for passports, and the proportion of these references steadily increased until at last no passport was issued unless the application had been cleared by the War Department.

Passports.—The passport regulations which became effective on September 15, 1918, confirmed this practice and laid upon the Military Intelligence Division additional duties in this regard. Seven departments of the Government were concerned in the regulation of foreign travel, but it was the duty of the War Department to make investigation of each individual for the purpose of determining his personal fitness, from a military standpoint, to enter or to leave the country. The volume of this work was very great, averaging, at its maximum, nearly 1,400 cases each day.

This section also supervised the work of the port control officers in this country and coordinated it with similar work abroad. The duties of the section were distributed among seven subsections, as follows:

The Executive Subsection supervised and coordinated the activities of the section, performed necessary administrative work, maintained statistical and geographical records, and kept in touch with the several Government departments interested in the control of foreign travel.

The Passport Subsection handled applications by American citizens (other than relief workers) for passports to leave the United States. It made sure that neither the applicant nor his sponsors had been adversely reported by any Government bureau and reported the facts to the State Department. The average number of such applications for the last four months of 1918 was 99 per day and the highest average for one week was at the rate of 265 per day. These applications were investigated and reported upon within three days from their receipt.

The Visé Subsection handled the matter of visés upon alien passports to enter this country and application for emergency passports by American citizens abroad. The cases handled for the last four months of 1918 averaged 45 per day and for one week averaged 111 per day.

The Alien Permit Subsection made the necessary investigations for the issuance of permits required by the passport regulations in the case of aliens departing from this country. The number of such applications in the last four months of 1918 averaged 246 per day and for one week rose to an average of 653 per day.

The Welfare Workers Subsection handled applications for passports by persons desiring overseas service with the several welfare societies attached to the Army (except the Y. M. C. A.). The uniform of such societies gave the wearer a semiofficial status in the eyes of foreign nations and rendered the Army responsible in case of an abuse of the extraordinary privileges afforded to these people abroad. After some unfortunate incidents arising from this source it was found necessary to make a thorough investigation in the case of each applicant before granting clearance. This was accomplished in an average of three weeks from the time of receiving the application. The number of these applications for the last four weeks of 1918 averaged 47 daily, and the largest week's average was at the rate of 166 per day.

The Y. M. C. A. Subsection handled the applications for passports by Y. M. C. A. workers, which averaged 47 daily during the last four months of 1918 and during one week averaged 169 per day.

The Liaison Subsection established communication with intelligence officers in this country, particularly at ports, and with military attachés abroad; exchanging information about traveling suspects and disseminating regulations for the coordination of travel control. Direct cable communication was maintained with American port-control officers in France.

The Fraud Section (M. I. 13) originated in the Quartermaster Corps in the spring of 1918, when at the request of the Quartermaster General an officer of Military Intelligence was detailed to organize a force to detect and prevent fraud and graft in the purchase and handling of quartermaster stores. On July 13, 1918, this force was transferred to the Military Intelligence Division and the scope of its duties enlarged to include the detection of any case of graft or fraud in or connected with the Army. At the beginning this group constituted a subsection of M. I. 3, but the work developed to such an extent that on September 24, 1918, it was made a separate section.

Fraud and graft.—Since becoming a section the rapid development of this work, both in volume and in the results accomplished, has continued. Since July, 1918, direct saving to the Government in cash refunded, property recovered, and claims reduced has been made to the aggregate sum of \$695,575.22, and cases now in hand are expected to yield a further saving of more than \$2,000,000. The section has investigated 1,230 cases, secured 558 arrests and 235 convictions; 924 cases are now pending.

In estimating the amount saved to the United States by the operations of this section, no account is made of the very considerable sum recovered as fines or of the probable savings by reason of the warning

to potential wrongdoers afforded by such a large number of convictions. The duties of this section were ultimately extended to include observation of the disposal of salvage in Europe, estimated to aggregate one and one-half billions of dollars in value.

The Military Morale Section had its origin in a subsection of the Army Section originally created to study the problems arising from the presence in the Army of a large number of soldiers who spoke and understood English with difficulty or not at all. On June 27, 1918, the duties of this subsection were extended to include the stimulation of morale generally throughout the Army; on August 18, 1918, it became a section and on October 19, 1918, it was detached from the Military Intelligence Division and became the Military Morale Branch of the General Staff. While still a part of the Military Intelligence Division, this section assembled a carefully selected personnel, established liasion with all military and civilian agencies whose cooperation would be useful in the psychological uplift of troops, laid down the basic plans for an organization to stimulate morale, carried on an extensive publicity campaign through the Committee on Public Information, and put into practice at Camp Gordon a plan of training foreign-speaking soldiers.

Field force.—During the emergency each military unit which constituted an independent command within the United States maintained its own Negative Intelligence organization under the immediate authority of the unit commander but acting in close cooperation with the Military Intelligence Division. There were more than four hundred such organizations. In addition there were maintained at New York, Philadelphia, St. Louis, St. Paul, New Orleans, and Pittsburgh, special Military Intelligence offices responding to the authority of the Director of Military Intelligence and employing an aggregate personnel of 45 officers, 80 enlisted men, and 120 civilians. These, together with the Intelligence organizations at department headquarters and ports of embarkation, constituted the principal branch offices of the Negative Intelligence system.

Demobilization.—Since November 11, 1918, the demobilization of the emergency force of the Negative Branch has proceeded rapidly. The Foreign Influence Section has been reduced to four subsections and the Army Section has been merged with it; the News Section now consists of but two subsections and the Travel Section is reduced to one officer. The Plant Protection Bureau is demobilized. The Fraud Section, on the contrary, is operating on a wartime basis and with increasingly effective results each month. The maximum of usefulness of this section does not appear to have been reached and a fruitful field for its activities will be presented for some time to come.

V. PURCHASE, STORAGE, AND TRAFFIC DIVISION.

The United States entered the war with only a partial conception of what it would mean to mobilize the Nation's whole resources for a single purpose, and without having worked out the concrete plans for achieving such an end. It was only by degrees that the country grasped the necessity for the assembling of its entire resources and it was only step by step that there was worked out the mechanism for accomplishing this end.

A few preparatory measures had been taken. The Navy, fortunately, had already achieved unity of organization. It had formerly operated under a bureau system similar to that of the Army, but this had given way to a unified organization which was to prove highly efficient under the strain of war. There was, however, no adequate machinery for coordinating the supply activities of the Army and Navy. Moreover, the carrying on of the war imposed new tasks for the performance of which it presently became necessary to create completely new emergency organizations independent of the existing departments of the Government.

The threat of the submarine to the world's shipping had already led to an appreciation of the necessity for a large shipbuilding program, and the Shipping Board and the United States Fleet Corporation were the agencies which had been created for the accomplishment of this end.

The shortage of tonnage and the necessity for controlling foreign trade, both as a means of directing the restricted flow of raw materials and of making more effectual the economic blockade of enemy countries, led to the establishment of the War Trade Board.

It was the submarine again, with its threat of starvation for England and France, which drove home the need for the United States Food Administration, charged with the control of the food problem as a whole.

The unprecedented war demands upon industry for the production of war supplies caused the creation of the Fuel Administration, which was made responsible for the production, distribution, and conservation of this fundamental of industrial output.

The necessity for operating the railroads of the country as a unified system to insure the uncongested transportation of men and materials led to all important lines being taken over by the Government and the creation of the United States Railroad Administration.

The Council of National Defense, which had been proposed as far back as 1911, was created by the act of August 29, 1916, seven months before the United States entered the war. It was not fully organized, however, until March, 1917, and while it was destined to play an important part in conducting the supply activities of the Government, it had to go through a long course of development before an efficient mechanism was reached for mobilizing national industry and for coordinating the activities of the numerous agencies through which the Government conducted the war. The council itself was composed of a group of six members of the President's Cabinet: The Secretary of War, the Secretary of the Navy, the Secretary of the Interior, the Secretary of Agriculture, the Secretary of Commerce, and the Secretary of Labor.

Provision was also made for a commission "advisory to the Council of National Defense," to be composed of men having special expert knowledge of industrial or natural resources.

During the course of the war the Council of National Defense and the advisory commission established a complex system of subordinate bodies to assist in the carrying out of their functions. It will be sufficient to mention here only three which have a special bearing on the story of the Purchase, Storage, and Traffic Division: The General Munitions Board, the Committee on Supplies, the Committee on Raw Materials.

The General Munitions Board, which functioned during the early stages of the war, developed later into the War Industries Board in July, 1917, and the President by letter of March 4, 1918, to its chairman, made it the great coordinating factor of the Government. The nature of the problems to be solved and the coordinating mechanism which was developed for their solution will be shown later. As the matter of military supplies stood first among those problems, it is necessary at the beginning to describe the supply organization of the Army as it existed in April, 1917, and as it developed during the ensuing months.

The Army supply system at the outbreak of the war.—The supply system of the Army of the United States was, prior to the present war, organized along lines of decentralization and consisted of a number of semi-independent bureaus but loosely coordinated either with the organizations of the line or with the staff of the Army and having practically no relations in common. The absence of correlation was further accentuated by decentralization of activities within the bureaus. Thus, within the Quartermaster Corps, by far the largest agency of this kind, operations were conducted by means of a considerable field force centering around the depot quartermasters, over whom the Office of the Quartermaster General in Washington had general supervision.

At the outbreak of war the supply bureaus of the Army were as follows: Quartermaster Corps, Ordnance Department, Medical Department, Corps of Engineers, Signal Corps.

The expansion of the War Department during the war to meet the need for new services led to the creation of several new bureaus, among which the following served as important supply bureaus: Construction Division, Chemical Warfare Service, Bureau of Aircraft Production. (Most of the purchasing for the Division of Military Aeronautics was done by the Bureau of Aircraft Production.)

A comprehensive statement of the duties and functions of the original supply bureaus, is probably not to be found anywhere. It is safe to say that even the statement of their duties as defined in United States Army Regulations is not complete and that there was considerable overlapping in regard to the procurement of supplies. The following, however, is a general indication of the supply functions of the five bureaus at the outbreak of the war:

1. The Quartermaster Corps: Subsistence, transportation, animals and vehicles, forage, camp and garrison equipage, clothing, construction of buildings, roads, bridges, ships, etc., retail stores at posts, **pay of the Army.**

2. Medical Department: Medical and hospital supplies.

3. Corps of Engineers: Certain construction, electrical supplies, engineering problems of supply routes.

4. Ordnance Department: Procured ordnance and ordnance stores, cannon and artillery vehicles, equipment and ammunition, personal and horse equipment and harness, ordnance tools, machinery, and materials, maintained arsenals and depots.

5. Signal Corps: All supplies connected with signaling, telephones, telegraph, balloons, airplanes.

The supplies needed for the support of the Army during the war were very much larger in amount than for the Navy, the Fleet Cor-

poration, and all other agencies concerned, and the system of Army supply by bureaus was responsible in large degree for the difficult problems of coordination which faced the Government in its task of mobilizing the national resources.

The declaration of war immediately induced the greatest activity in the five supply bureaus and put them under tremendous pressure for the adequate performance of their respective functions on the scale called for by the magnitude of the war. Their personnel was increased with great rapidity. Their structure underwent considerable changes made imperative by the great increase in their tasks. Each bureau felt keenly the duty imposed upon it of obtaining with the greatest speed possible the enormous mass of supplies and material needed for the conduct of military operations. They naturally proceeded along established lines, that is to say, as they were independently constituted, each bureau had its own duties to perform and set about those duties in the main without any adequate coordination with the other bureaus or with other governmental purchasing agencies.

The war, therefore, began with the supply system of the Army organized on the bureau plan, the bureaus being five separate purchasing agencies with separate systems of finance, storage, and distribution, each feeling itself largely independent within its own sphere of action, and accustomed by long habit and tradition to perform its various functions without reference to the activities of the others or of other departments of the Government. Accordingly, when the Army went into the Nation's markets to buy the vast body of supplies needed for the war, it went not as a single agency, seeing the problem of supply as a whole, but as five separate bureaus competing with each other, as well as with the other great agencies of the Government and of the Allies, for manufactured articles, raw materials, industrial facilities, labor, fuel, power, and transportation.

The Council of National Defense and the War Industries Board.—Some of the disastrous effects of such a system of competitive purchasing by numerous Government agencies in a war of such magnitude are apparent on the surface. In the case of purchases within a given industry, it has been generally recognized that large-scale purchases by the Government might completely disorganize the industry through absurdly high prices both to the Government and to civilians, and might at the same time fail to call forth in full measure the capacity of the country for the production of the particular article. It has been a matter of knowledge also that the process of placing orders for finished articles by bureaus and departments of the Government acting without a common plan tended to stimulate a scramble for raw materials which is equally disorganizing.

There were other aspects of the situation, however, which have not always been considered in connection with these. There was a competition for labor as well as for raw materials, and a resulting disorganization of the labor market, with great scarcity of labor in some regions and actual unemployment elsewhere. Furthermore, the unsupervised placing of war orders resulted in a congestion of contracts, both regional and relative to business firms. The total of contracts placed in a given region would outrun the utmost possibili-

ties of that region in the matter of manufacturing facilities, labor, fuel, transportation, power, etc. This was a corollary of the fact that individual firms would take contracts actually far in excess of their facilities or of their ability to obtain raw materials, labor, transportation, or new facilities. Moreover, the power to commandeer property was originally exercised by individual bureaus and departments without regard to its possibly injurious effect upon the war program of other bureaus.

The responsibility which rested upon each bureau and upon numerous divisions and subdivisions of the bureaus was to procure and deliver in France the particular supplies, materials, or munitions with which it was individually charged. In discharging this obligation each of these numerous agencies played a lone hand. Each naturally wished to show a record of large achievement in getting to France the particular things for which it was individually responsible. It was not an accepted principle early in the war, as it came to be later, that to preempt tonnage space for shipment in excess of actual current needs was, if anything, a greater offense than a failure to provide supplies according to schedule. The carrying capacity of the available ocean tonnage was at all times the neck of the bottle of supply. The system of individual procurement by bureau ignored this fundamental fact, and the natural result was congestion at the ports. This port congestion rapidly developed into a general congestion of railroad facilities, including very serious difficulties in the movement of fuel needed by war industries. An important contributing cause of the fuel shortage was the concentration of contracts in congested districts already referred to as a product of the bureau system of procurement. Other phases of the same problem were shortages of electric power and other power in certain of the congested districts. Moreover, in the carrying out of war contracts placed in the same particularistic way, new manufacturing facilities were frequently created or planned in congested areas which called for raw materials, transportation, and labor when at the same time elsewhere in the country adequate and unused facilities already existed. The outcome of all these difficulties was inevitably such a slowing down in the output of war supplies as resulted, in the worst days of the winter of 1917-18, in conditions approaching partial paralysis of the war machine.

The possible occurrence of such problems had been dimly envisioned in advance. The Council of National Defense had been proposed as early as 1911 with no war anywhere in sight. The council was actually established seven months before the United States declared war with Germany. Its final development was the powerful War Industries Board, which became the great coordinating agency of the Government in the matter of supplies. And within the Army organization the Purchase, Storage, and Traffic Division, with functions dovetailing into those of the War Industries Board, was created in the spring of 1918 for the purpose of effecting the same sort of coordination within the war machine, and came eventually, acting as the agency of the General Staff, to supervise and synchronize the supply activities of the Army bureaus.

But the highly efficient coordinating machinery which finally came into existence was developed only step by step as new phases of the problem of coordination presented themselves. As to the more

general agencies devised as outgrowths of the Council of National Defense or of its advisory commission, reference has already been made to the Committee on Supplies, the Committee on Raw Materials, and the General Munitions Board. The development of these three boards into a nicely articulated organization resulted in the War Industries Board, which stood at the end of the war at the apex of supply coordination. An outline of the development of this organization with which the Purchase, Storage and Traffic Division was closely related as the coordinating factor of the branch of the Government most vitally involved in the prosecution of war, forms a necessary prelude to an account of the later.

The Committee on Supplies which came into existence on February 12, 1917, was organized to cooperate in an advisory capacity with the purchasing officers of the War and Navy Departments in securing requirements of clothing, equipment, and subsistence. In its composition the regular principle was followed of selecting men in close touch with the particular industries concerned and thoroughly informed as to the conditions which would be encountered in the conduct of Government purchasing. The committee was therefore in a position to render service to the Government procuring officers. At the very outset, an order was issued by the Secretary of War under date of April 12, 1917, which suspended the peace-time system of advertising for bids. Under the new system the bureaus were advised by the Committee on Supplies as to the business concerns with which orders could best be placed, and in many instances mills and factories which had never before produced Government goods were induced to place their plants at the disposal of the Government. In these ways the difficult task of procuring clothing, equipment, and subsistence was greatly facilitated at the outset. Within its field of action also the Committee on Supplies endeavored to coordinate the procuring activities of the different bureaus and departments. It performed numerous other services of an advisory character, nearly a billion dollars worth of purchases having been arranged with its advice and assistance. This committee went out of existence in January, 1918.

Under the Committee of Raw Materials was organized a large number of advisory and cooperative committees appointed from the leading industries dealing with raw materials. The committees assisted in assembling trade information for mobilizing the sources of supply of the various raw materials. The Committee on Raw Materials was not a purchasing body, but it gave important advice and assistance in arranging for very large purchases by the Government departments. The committee acted by mobilizing the industries and then recommending to the Government purchasing agencies how best to utilize the facilities so provided.

The General Munitions Board began work on April 9, 1917. Its attention was directed particularly, though not exclusively, to ordnance, ordnance supplies, military vehicles, surgical supplies, optical glass, gauges, tools, and dyes. Its efforts were devoted toward the development of production facilities, the coordinating of Army and Navy purchases, the establishment of storage facilities, and the cantonment construction program, in all of which particulars its services were very useful to the procuring bureaus.

The board performed in a preliminary fashion important functions afterwards turned over to more completely specialized committees. Thus the work of the later Priorities Committee, the Clearance Committee, and Price-Fixing Committee had its beginnings in the early operations of the General Munitions Board.

In July, 1917, the General Munitions Board was transformed into the War Industries Board. This board in turn was completely reorganized by the letter of the President of March 4, 1918, and its powers at the same time were very greatly increased. By Executive order of May 28, 1918, the War Industries Board consisted, in addition to the board members themselves, of a considerable group of commodity sections or divisions and a set of boards and committees, each charged with a general function. Among the most important of the latter were the Priorities Board and the Priorities Committee, the Clearance Committee, the Price-Fixing Committee, and the Requirements Committee. The Commodity Sections were composed of men who had expert knowledge each of a particular commodity, and each section included in its membership representatives of the Government purchasing departments. The machinery thus developed was operating at the end of the war with a high degree of efficiency. The problems of coordination had practically all found adequate solution.

The passage of the Overman Act.—The economic embarrassments which confronted the Government during the initial months of the country's participation in the war, have already been mentioned. As cold weather came on, in the latter part of 1917, other difficulties developed. Shortages in clothing, hospital equipment, and other supplies led to hardships in Army camps. An epidemic of pneumonia also developed in the camps which was attributed by some to the shortages in clothing and shelter. About the same time, rumors began to be spread concerning serious failures to realize various parts of the program of supply which had been laid down. The ravages of the submarine were steadily cutting down available ocean tonnage, and great apprehension came to be felt as to the possibility of supplying the Nation's forces and those of our allies with adequate quantities of food and other things highly essential in the conduct of the war. Added to this the uncoordinated procurement activities of the Army bureaus and of the other Government agencies had resulted in excessive and unbalanced railway shipments which first overtaxed the port facilities and finally developed into an extremely serious congestion of the railroad systems. Connected with this was the shortage in fuel which was so widely felt both by the war industries of the country and the civil population. At the same time it became known that a great and final military drive by the Germans was being planned for the spring of 1918, and the whole situation led to a widespread feeling of uncertainty and uneasiness. This led very naturally to inquiry as to the efficiency being shown by the Government in the conduct of the war and to criticism, both destructive and constructive, of methods of production and organization in vogue.

This widespread uneasiness found its center and culmination in a congressional investigation of the conduct of the war, and on December 12, 1917, hearings were begun by the Senate Committee on

Military Affairs. Hearings continued until the end of March and during the whole time, in almost daily sessions, the committee heard testimony from the Secretary of War, the heads of the supply bureaus and others whose evidence was regarded as helpful in throwing light on the situation. The investigations served to give definite form to the various criticisms of the Government in its conduct of mobilization and supply, and also to bring out the Government's defense or extenuation of the progress of its program.

During the progress of the hearings a bill was introduced in the Senate providing for a ministry of munitions somewhat along the lines which had been followed in England and France. The proposed new agency would have been charged with the responsibility of supplying the requirements of the Army, Navy, Emergency Fleet Corporation, and the Allies. Another bill was introduced providing for a small war cabinet, to advise with the President and to direct, under a unified plan, the operations of the departments in the conduct of the war. These measures were consistently opposed by the War Department, which held that existing machinery should not be disrupted by such radical and comprehensive reconstruction, but that measures should be taken, and were being taken, for improving the coordination and efficiency of the various boards and departments. To facilitate the carrying out of this process, Senator Overman prepared and introduced the Overman bill, which finally prevailed, although it did not become law until May 20, 1918. This act, in lieu of creating a single agency for the conduct of all supply operations simply gave the President a free hand and complete power to readjust the existing framework of the Government.

During the hearings the chief items under consideration were clothing, hospital conditions at camps, shoes, rifles, machine guns, artillery ammunition, saddles, blankets, and gas masks. The measures taken by the War Department for the supply of these articles were fully discussed, the Secretary of War and other officials explaining difficulties which had been encountered, and claiming for the department on the whole, a high degree of success in meeting the difficulties which had been encountered. The most important phase of the investigation, in the present connection, is the criticism of the machinery which had been provided for carrying on the task of supply, and the official statement by the Secretary of War of organizational plans.

The criticisms of the Senate committee amounted to a vigorous indictment of what may be called the bureau system of supply under which supplies were being independently procured by the various bureaus of the Army and also by the Navy, Emergency Fleet Corporation, and the Allies. Great emphasis was laid upon the evils inherent in a system of procurement by a considerable number of separate agencies and the judgment was forcibly expressed, not only that the task of coordinating the activities of these various agencies was not being adequately performed but that the failure to accomplish this was threatening disaster in the conduct of the war as a whole. In regard to the War Industries Board the main objection was that it did not have legal or adequate powers to bring about effectually the coordination in the supply program which was clearly seen to be necessary, and that there did not exist anywhere

under the President any agency armed with adequate power for the achievement of this end.

It was pointed out that at most the War Industries Board could only advise the procurement offices of the various branches of the Government as to where and at what price to buy; that there was no compulsion upon these officers to take the advice offered and that the whole effort of placing orders and making purchases, mobilizing and speeding up industry, taking care of transportation, and planning out in advance, was scattered down through at least a dozen different agencies. It was also asserted that no matter what steps were taken to effect coordination within the War Department no solution of the problem would be reached on account of the necessity that would still exist of coordinating that department with other departments of the Government.

The demand, therefore, was for a war cabinet and also for a ministry of munitions, this ministry to be headed by a civilian who should be a business man of high ability. One phase of the criticism was that the supply program which was essentially a business operation, was being handled by military men whose training did not give them an adequate preparation for the task. The reply of the administration, given through the Secretary of War, was that arrangements had been made for bringing into the War Department, in positions of authority, business men of a high order of ability; that important reorganizations were under way in the Ordnance Department and Quartermaster Corps; that a wide extension of the functions of the War Industries Board was planned; that unified action in the field of transportation and embarkation of supplies had been provided by the appointment of a Director of Storage and Traffic with the Embarkation Service reporting to him; that the General Staff had been reorganized into five main divisions each presided over by an assistant to the Chief of Staff and each charged with the responsibility for a definite part of the war program, and finally that as one of these new divisions of the General Staff, provision had been made for a Director of Purchases and Supplies, whose functions within the War Department should be the coordination of the supply activities of the Army bureaus. A business man of large achievements had been appointed Surveyor General of Supplies to assist the Director of Purchases and Supplies in this task.

The program of the Senate committee was that the supply activities of the great purchasing agencies of the Government should all be combined under one man. The alternative plan of the administration was that the great agencies already in operation should be left undisturbed, but that more adequate mechanism should be provided for supervising and coordinating their activities and rendering them more efficient.

The successful passage of the Overman bill caused the alternative program for coordination to prevail. By means of the authority conferred by the Overman Act, it became possible to carry out without difficulty much that would have been difficult or impossible without such powers. The War Industries Board was developed into the single coordinating body of Government supply agencies and mobilized industries, and out of certain of the measures cited by the Secretary of War before the Senate committee was erected a similar

supervisory and controlling agency over the supply affairs of the War Department—the Purchase, Storage and Traffic Division of the General Staff.

ANTECEDENTS TO THE PURCHASE, STORAGE AND TRAFFIC DIVISION.

The Purchase, Storage and Traffic Division of the General Staff was created by General Orders, No. 36, War Department, April 16, 1918, to serve as a single agency for the coordination of the supply activities of the Army.

It has already been pointed out that this branch of the General Staff was the outgrowth of certain movements that had been going on within the War Department toward the establishment of supervision of the supply activities of the Army which would tie together its procurement functions and other collateral activities related to the distribution of supplies. The Purchase, Storage and Traffic Division resulted from an amalgamation of those antecedent agencies and it is necessary to trace their development into the single coordinating body. The first of these antecedent organizations was the Storage and Traffic Service.

The Storage and Traffic Service.—Army supplies for overseas, after leaving the factory, had to be transported on the railroad, in some cases stored in warehouses at the port of embarkation or elsewhere and finally had to be loaded on vessels and dispatched on their journey across the ocean. It was early seen that the existing agencies for performing these functions were not likely to prove adequate. In the matter of embarkation particularly it was obvious that independent action by the several bureaus would lead to impossible conditions, and that a single coordinating and controlling agency was called for which should handle the matter of embarkation for all ports and the Army as a whole.

To meet this need, the Embarkation Service was erected in the office of the Chief of Staff on August 4, 1917, by General Orders, No. 102, War Department, 1917, to take charge of embarkation matters for all supply bureaus of the Army. The officer in charge was designated as chief of the Embarkation Service. The principal organization change brought about by the establishment of this service was its effect upon the Water Transportation Branch of the Quartermaster Corps which had been at the outbreak of the war charged with the supervision of the entire operation of the Army Transportation Service. When in the early summer of 1917 the ports of embarkation were established, the authority of the Water Transportation Branch was somewhat subordinate to that of the commanding generals of the ports, the superintendents of Army transports at the ports being placed under the jurisdiction of the commanders of the port.

The effect of the establishment of the Embarkation Service was to attach the Water Transportation Branch to the former, although the latter continued as a separate entity. It may be said that the Embarkation Service performed certain of its functions through the Water Transportation Branch.

When the railroad congestion developed in the winter of 1917-18 it was appreciated that further steps were necessary for the proper handling of war supplies after they left the factory. By General

Orders, No. 167, War Department, December 28, 1917, therefore, the Storage and Traffic Service of the General Staff was created in charge of a Director of Storage and Traffic. The Embarkation Service, already in operation and reporting to the Chief of Staff, was transferred to the new Storage and Traffic Service.

One of the first measures taken by the Director of Storage and Traffic was to provide a War Department agency for supervising and handling transportation by rail. On January 10, 1918, a Director of Inland Transportation was appointed in charge of an organization which was first known as the Division of Inland Transportation and later as the Inland Traffic Service.

An agency was also established for supervision of all Army storage projects. The storage requirements of the Quartermaster Corps were approximately 80 per cent of the total storage requirements of the Army in the United States. The officer who had been in charge of the Storage Division of the Quartermaster Corps was given the title of the Director of Storage and placed in charge of one of the main divisions of the new Storage and Traffic Service. This arrangement was also natural, due to the fact that the Director of Storage and Traffic at this time was also Acting Quartermaster General. The task of the Director of Storage was to coordinate the storage activities of the bureaus, together with certain operating functions in the case of storage warehouses which were used in common by more than one bureau.

The organization of the Storage and Traffic Service was completed by the establishment of the executive office of the director and an administrative subdivision.

The Director of Purchase and the Surveyor General of Supplies.—Meanwhile a beginning had been made in the work of coordinating the procurement and production activities of the supply bureaus. Reference has already been made to the statement of the Secretary of War before the Senate Committee on Military Affairs, in which it was explained that there had been appointed a Director of Purchase and a Surveyor General of Supplies, to assist in the task of reviewing and systematizing the supply activities of the Army bureaus. The appointment of the former had been made by General Orders, No. 5, War Department, January 11, 1918.

It was out of the above elements that the Purchase, Storage, and Traffic Division was constructed. General Orders, No. 14, War Department, February 9, 1918, gives the entire organization of the General Staff as established at that time, including the five divisions of the General Staff, each one under an Assistant Chief of Staff. One of these assistant chiefs was the officer in charge of the coordination of purchases with the slightly altered title of Director of Purchases and Supplies, and another was the Director of Storage and Traffic.

By General Orders, No. 36, War Department, April 16, 1918, these two divisions were combined into the Purchase, Storage, and Traffic Division. The functions with which the office of the Director of Purchase and Supplies had been charged were taken over by a newly constituted Purchase and Supply Branch which became one of the four main parts of the new Purchase, Storage, and Traffic Division—the other three being Embarkation, Inland Traffic, and Storage.

These four continued to be the essential parts of the Purchase, Storage and Traffic Division for several months.

The history of these four branches will now be taken up one by one. The Purchase and Supply Branch was the last of the four to be established. Its development will nevertheless be outlined first, because the general reorganization of the Purchase, Storage and Traffic Division during the latter part of the summer of 1918 comes in as an essential part of this development.

The Embarkation Service, Inland Traffic Service, and Storage Branch were much less affected by the reorganization, and as a matter of presentation the account of each of those can best be given in its entirety after the reorganization arrangements have been explained as a part of the history of the Purchase and Supply Branch.

In connection with the plans of the new Purchase and Supply Branch, the office of the Surveyor General of Supplies was abolished.

ESTABLISHMENT AND ORIGINAL ORGANIZATION OF THE PURCHASE, STORAGE AND TRAFFIC DIVISION.

General Orders, No. 16, War Department, April 6, 1918, providing for the consolidation into one division of the General Staff of the Purchase and Supply Division and the Storage and Traffic Division, had the effect of the bringing together under one authority of all the coordinating machinery of the Army having to do with the procurement of supplies and their custody and distribution. The latter functions had been in operation, in one form or another, for some time. The coordination of procurement had been undertaken but a few months before the consolidation, under the Director of Purchase and Supplies, whose office, under the rearrangement, became the Purchase and Supply Branch of the Purchase, Storage, and Traffic Division. An account of its work of handling the fundamental problem of supply naturally precedes a description of the more collateral services of storage and distribution.

Report of the Committee of Three.—On April 2, 1918, shortly before the consolidation resulting in the Purchase, Storage, and Traffic Division was effected, a committee of three was appointed by the Acting Secretary of War to report on a plan of reorganization of the office of the Director of Purchases and Supplies so that it might function efficiently with the War Industries Board and the purchase bureaus of the Army and generally discharge all of the duties and perform all of the functions implied or expressed in General Orders, No. 14. This committee was made up of an officer representing the General Staff, a representative of the War Council, and a representative of the Council of National Defense.

The report of this committee which served as the basis of organization later developed in the Purchase and Supply Branch was an exhaustive study of the problem in all its ramifications. Its main features are as follows:

1. It gave expression to the undesirable results already disclosed as of the essence of the bureau system of supply, and the serious disaster which threatened the war program if the system were not speedily remedied.

2. It attempted to show the various relationships which the Division of Purchase and Supplies must necessarily have with (a) the

supply bureaus, (b) the War Industries Board, (c) other parts of the General Staff organization.

3. It enumerated and explained in order the particular tasks which necessarily fell within the functions of an agency, such as the Division of Purchases and Supplies, which might assume responsibility for the Army supply program.

4. It outlined the nature of the organization which should be set up in order that the division might adequately carry out these functions.

The Purchase and Supply Branch (which was still at the time the report was written the Division of Purchase and Supplies) was conceived as having relationships with the Division of Operations of the General Staff, with the Division of Storage and Traffic, with the War Industries Board, and, of course, with the supply bureaus of the War Department.

Its relation to the Division of Operations was in connection with the Army program. The Division of Operations was charged with responsibility for the formulation of the military program in terms of men and time, and the Purchase and Supply Branch was thought of as receiving the official Army program from the Division of Operations of the General Staff and transmitting that program to the supply bureaus in order that it might be used by the latter as the basis for the calculation of requirements for the resulting procurement of supplies necessary to carry out the program. Included in the tasks of the Purchase and Supply Branch would be the duty of bringing about in the bureaus a uniform and common interpretation of the Army program, so that there might be everywhere coordinated action toward identical ends.

The anticipated relations with the Division of Storage and Traffic were due to the possibility that shortages of storage space, traffic congestion, and other developments in this general field might possibly necessitate action, for example, the curtailment of production at some point of the procurement program under the jurisdiction of the Purchase and Supply Branch.

Relations with the War Industries Board were already being actively carried on by all of the supply bureaus of the Army. This hydra-headed appearance of the War Department in its contacts through the War Industries Board with the productive agencies of the nation had been up to this time one of the evils flowing from the bureau system, an evil which was complained of throughout the organization of the War Industries Board itself, and furthermore, as we have seen, an evil which had been attacked by the members of the Senate Committee on Military Affairs. The plan proposed to be substituted in all transactions with the War Industries Board was the single representation of the Army in matters of supply through the agency of the Division of Purchases and Supplies.

In the fourth place, and most fundamental of all, the very creation of the Purchase and Supply Branch was for the purpose of the relationships which it would maintain with the supply bureaus of the Army. In matters of supply it was to supervise these bureaus and work out the most effective plan for bringing about a perfect co-ordination of their activities. This was the very kernel of the problem, and in default of its successful solution it was felt that the whole supply program of the Army might be threatened with disaster.

As to the tasks which the new organization must of necessity undertake and the form of organization which must be provided for the performance of each of these tasks, they were expressed in the report as falling under the following heads:

Commodities.—Since the War Industries Board had developed an elaborate set of commodity sections it was appreciated by the Committee of Three that the Army must develop a somewhat similar organization to deal with the same set of commodities from the standpoint of the procurement problem of the Army.

Priorities.—It was felt that a definite organization was needed, through which the Purchase and Supply Branch might represent the Army in all priority questions handled by the War Industries Board.

Clearance.—Plans had been made for abolishing the Clearance Committee of the War Industries Board. It was recommended, however, that this committee be continued as a forum for the informal discussion of questions of short-time procurement.

Requirements.—The procurement function of the bureaus was conceived of as divisible into three great phases, the first of which was the calculation of Army requirements by the several bureaus.

Purchases.—The second great phase of procurement by the bureaus being the making of purchases, the Purchase and Supply Branch, as a coordinating and supervising agency, would need to erect a special purchase section specifically charged with supervision over this phase of bureau activity.

Production.—Similarly, as a third essential in a successful procurement policy was the following up and expediting of production, as there was need in the new organization for a supervising agency in this field.

Finance.—Since by General Orders, No. 14, the supervision and coordination of the financial operations of the bureaus had been made the duty of the Purchase and Supply Division, a special section for the performance of this task was recommended.

Standardization of contracts.—This was conceived as a separate function. Actually it was later included as one of the aspects of the supervision of purchases.

Replacements.—Numerous agreements had been made with the Allies under the terms of which they were to furnish various war supplies. In connection with these agreement the supply bureaus had assumed numerous replacement obligations; that is, obligations to replace the raw material involved in the supplies so furnished, or the making good in some other way of such replacement obligations as were involved in the transaction. A definite section or unit was recommended to handle these replacement obligations for the Army as a whole.

The initial organization.—When the new Purchase and Supply Branch was set up, plans were immediately made for an organization along the lines just indicated. As a matter of actual and formal organization, there were established to deal with the tasks defined in the report four fundamental sections.

The Supply Program Section was charged with general responsibility in the field of requirements, including the obtaining of the Army program from the Division of Operations, the general supervision of requirements calculations on the part of the bureaus, and

the representation of the Army on the Commodity Committee of the War Industries Board. The commodity specialists who became the representatives of the Army on the Commodity Sections of the War Industries Board were also placed under the jurisdiction of the Chief of the Supply Program Section. A special unit of the Supply Program Section was organized to handle the matter of replacements.

At the outset this section had four main tasks: The supervision of requirements calculations; the representation of the Army on the Requirements Committee of the War Industries Board; the supervision of the work of the Army commodity committees; and the supervision of replacement obligations, and later of purchase and sales relations with the French and British missions.

When the reorganization came in the latter part of August, the requirements function was transferred to a Statistics and Requirements Branch, and the Supply Program Section, with the new name—External Relations Branch—was charged with the responsibility for representing the War Department in all supply matters which involved contracts with other agencies. These relationships were mainly, of course, with the War Industries Board. They included the price fixing, clearance, and priorities functions, and the units which had been handling these matters were transferred to the jurisdiction of the External Relations Branch.

The Purchase Section was charged with numerous functions having to do with supervision of the purchase activities of the bureaus. Included within the Purchase Section also were set up units charged with: (a) The commandeering activities; (b) the appraisal of commandeered property; (c) the clearance of Army contracts, both as between the Army bureaus and also as to transactions arranged through the Clearance Committee of the War Industries Board; (d) the supervision of purchase and rental of real estate; (e) the standardization of contracts.

The largest single task of the Purchase Section was the consolidation of procurement. This work, as well as the other functions of the section, will be described later. It is sufficient to say here that it was a necessary preliminary to the carrying out of the main features of the reorganization in the latter part of the summer. As a part of that reorganization a Purchase Branch was established, which took over most, though not all, of the duties of the former Purchase Section.

A Production Section was organized somewhat later. The one change in the Production Section up to the end of the war was the change of its name to the Production Branch.

Under the terms of Supply Circular No. 80, August 27, 1918, the name of the Finance Section was changed to the Accounts Department. Its duties prior to this time were supervisory in character. When the Accounts Department was set up it was intended as an operating department in which would be consolidated the finances of all the bureaus. This plan was not carried out until early in October when Supply Circular No. 98 established the Finance Department with a Director of Finance in charge.

In addition to these four sections, each charged with a certain segment of the fundamental task of the Purchase and Supply Branch, there was also established an Administrative Section, and

an Emergency Section to take prompt action on emergency matters for which organization could not be provided in advance.

In the report of the Committee of Three it had been set forth with great emphasis that adequate statistical records of the procurement bureaus were indispensable to the functioning of the coordinating supply office. It was insisted that the director should have power to prescribe such records in detail for the bureaus, that there must of necessity be a constant flow of such statistical records from the bureaus to his office and that he must have direct and unquestioned access at all times to the primary statistical records of the bureaus; also that for the adequate performance of his duties he must have as a matter of organization a highly qualified statistical section as the mechanism for devising and instituting the statistical records essential to the operation of the office. A Supply Accounting Section was therefore organized.

When the Purchase, Storage and Traffic Division was reorganized the Supplies Accounting Section became the Statistics and Requirements Branch of the division. It took over from the Supply Program Section the supervising and coordinating of requirements calculations in the supply bureaus, in which work it was successful in bringing about the establishment of a uniform system.

Effect of the reorganization on the Purchase and Supply Branch.—Reference has already been made to the reorganization which was effected in the latter part of the summer of 1918. The nature of this reorganization, the causes leading up to it, and the process by which it was effected are explained in connection with the account of the Purchase and Supply Branch whose work it most closely affected.

During the course of the hearings before the Senate Committee on Military Affairs, the Secretary of War, in explaining his plans for improving the efficiency of the supply system, made the statement that the complete consolidation in a single agency of the procurement activities of the supply bureaus (with the exception of highly technical articles) was a matter then under consideration. Such a consolidation, while it probably would not have met the extreme wishes of critics, would have gone a long way in that direction by concentrating, under one man, the procurement of the great bulk of war supplies. There were difficulties, however, in the way. The opposition to any such plan on the part of the chiefs of the bureaus especially could be counted upon. Their opposition was founded upon the natural feeling that any sweeping reorganization of the existing procurement machinery might operate to disorganize the bureaus, which, they claimed, except in certain particulars, were already functioning effectively and furnishing the American Expeditionary Force with supplies.

Early efforts were confined purely to supervision and correlation rather than reorganization of the bureau machinery, though at the same time the work of consolidating procurement was being taken up article by article.

Early in the summer of 1918, following consultations between the chief members of the staff of the Director of Purchase, Storage, and Traffic, the chiefs of supply bureaus and others, tentative plans for a consolidated service of supply for the United States were formulated.

These plans were embodied in an important memorandum which, on July 18, 1918, was presented by the Director of Purchase, Storage and Traffic to the Chief of Staff for approval.

Even this plan did not contemplate the complete merging of all procurement activities. Ordnance, aircraft, and certain other highly technical material of special and changing design and peculiar use was excepted from the plan of centralization, though not from centralization of storage, traffic, and embarkation. Briefly, there was to be a central agency for the procurement of all standard articles of Army supply (except technical articles) and for the centralized administration of all distribution, including storage, rail and water transportation, and embarkation.

The plan was presented to the chiefs of the supply bureaus for criticism. Under date of August 26, 1918, the plan was approved in principle, and authority was granted to outline the successive organizational changes which would be involved. The plan as submitted was disapproved to the extent that the Construction Division was to remain under the Division of Operations of the General Staff.

The plan as approved, together with an explanation of the early stages of the reorganization as it was actually carried out, was presented in Supply Bulletin No. 29, issued November 7, 1918.

The following is a condensation of the organic weaknesses of the bureau system of supply as it existed up to the time of the reorganization:

1. Combination of supply functions and operating functions.
2. Nine independent responsibilities for supply.
3. Nine separate and nonuniform systems of (a) requirements, (b) purchase, (c) storage, (d) distribution, (e) fiscal accounting, (f) property accounting.
4. No uniformity in the various bureaus as to functions: (a) The Bureau of Aircraft Production was a pure purchase bureau having no function of operation and no other function of supply; (b) the Ordnance Department was a supply bureau with no function of operation; (c) Military Aeronautics and Coast Artillery were purely operating services with no or a negligible function of supply; (d) the Engineer, Medical, and Signal Corps were both operating and supply bureaus; (e) the Quartermaster Department was an operating bureau and supply bureau.
5. No uniformity as to method, organization, practice, and nomenclature.
6. Purchase and Storage were not operated as they should be on a suitable commodity classification.
7. At least five independent conduits of supply reaching from primary sources to ultimate points of use. This made impossible a proper synchronizing in supply of articles of a related use.
8. The combination of supply and operating functions prevented an adequate supervision of supply.
9. The supplies even for a minor unit of troops came from a number of bureaus.
10. The bureau system prevented a uniform storage system for the Army as a whole.

11. Plurality of supply organizations had the following tendencies and effects: (a) Fostered competition between Government purchasing agencies; (b) prevented lower prices for increased or bulk

orders; (*e*) resulted in groups of single similar tasks too small for the best man and too large for the mediocre man; (*d*) multiplied personnel; (*e*) confused organization and rendered supervision difficult; (*f*) multiplied types, quantities, and design of standard articles, thus creating confusion and lack of interchangeability in supply; (*g*) prevented uniformity of nomenclature, method, and practice; (*h*) prevented procurement and accumulation of reserves of articles of related use in step with the Army program and with available facilities for shipping and storage; (*i*) resulted in five separate sets of property accountability for line officers, all different and all unnecessary; (*j*) prevented proper distribution of production fields and of assembly and storage depots; (*k*) resulted in conflicting and unknown requirements.

The organization of supervising and operating units set up under the reorganization to remedy or improve these conditions will be described later. It will be noted here that the former Purchase and Supply Branch disappeared, its various component units finding a new arrangement.

The tasks of the Purchase and Supply Branch.—The development of the Purchase and Supply Branch from the point of view of organization has already been outlined. The tasks which this organization undertook to perform will now be considered one by one.

Requirements.—The first of these is the supervision of the calculation of Army requirements. For a large number of articles required by the Army the fundamental data needed for the calculation of requirements are:

First, the military program in the terms of men and time.

Second, table showing the organization of the Army into its fighting units.

Third, unit equipment tables.

In the case of certain special articles, special projects are necessary. For the larger part of the work of calculating requirements, however, the starting point is the Army program. This Army program the Purchase and Supply Branch was to obtain from the Division of Operations of the General Staff, where it had its origin, and it was the duty of the Purchase and Supply Branch in turn to pass this program on to the supply bureaus, to make certain that it was given uniform interpretation in the bureaus, and in general to supervise the process by which requirements were calculated.

Among the various reasons which made this supervision of requirements imperative was the fact that where shortages existed either in finished articles, raw materials, or production facilities, it was necessary for the War Industries Board, in the performance of its duty of insuring adequate supply facilities, to have this information in regard to the requirements of the Army as a whole.

When the requirements work of the Purchase and Supply Branch was begun the authorized programs already in use were out of date, due to the great acceleration of troop shipments which had begun as early as April, 1918, in response to appeals from the Allies which were based on the situation at the fighting front. It was a very difficult matter, because of the shortage of tonnage and numerous other considerations, for the Army to adopt an authoritative program covering the new undertakings in the matter of sending troops to France.

Particularly was it difficult to project that program in any reliable way for a year or two years in advance, no matter how desirable this might be from the point of view of the necessity of making arrangements for certain materials considerably more than a year in advance of the time finished articles must be ready for use.

The enlarged Army program was announced July 25, 1918. Even this program was projected only through June, 1919, and it was not until September 3, 1918, that the authoritative projection of this program into the year 1920 could be officially adopted. For at least two months, therefore, requirements work was necessarily preliminary and tentative. Not until the latter part of the summer did it become possible to calculate Army requirements on an authoritative program projected sufficiently far into the future.

The work of supervising requirements calculations in the bureaus consisted in:

(a) The establishment of such requirements units where they did not exist and their development where they were not adequate.

(b) The adoption of adequate and uniform blank forms for the calculation and submission of calculated requirements as well as of the basic data underlying them. This included the laying down of numerous rules governing reserves, fundamental allowances, antedating to allow for shipment from factory delivery to point of issue in France.

(c) The combining, where necessary, of the requirements from various bureaus into total figures for the Army.

(d) The transmission of final results to the War Industries Board as well as to other parts of the Army organizations.

In carrying out this work two fundamental units were organized—one for articles of issue, the other for raw materials. The Ordnance Department and the Quartermaster Corps alone had developed effective organization for the calculation of requirements for articles of issue. Nowhere in the bureaus had units been established for the conversion of such requirements into terms of their raw material content, yet it was necessary for the War Industries Board to know, not only the requirements of finished articles, such as shoes and uniforms, but also the amounts of leather of various kinds, and the amounts of wool, etc., which were involved in making the final products.

The task of establishing and developing adequate units in the supply bureaus for the calculation of requirements was difficult, due to scarcity of qualified personnel and the difficulty of securing uniform practice.

Incidental to the reorganization of the supply system in the latter part of the summer of 1918 there occurred a consolidation of bureau requirements units in the office of the Director of Purchase and Storage (the establishment of which is described later). The Requirements Division of the Office of the Director of Purchase and Storage took over the calculation of requirements for those articles formerly handled by the Quartermaster Corps, and for all nontechnical articles formerly handled by the Corps of Engineers, Medical Department, and the Signal Corps. This was in accordance with Supply Circulars Nos. 101, 102, and 103, which represent steps in the carrying out of the general reorganization. Looked at broadly, this

change was a step in the direction of consolidation in one central office of all requirements calculations for the Army. It was a development, however, which was interrupted in midcourse by the signing of the armistice.

Rules and regulations for the calculations of requirements were given to the supply bureaus in Supply Circulars Nos. 69 and 70.

In summary it may be said that shortly before the armistice was signed the calculation of requirements for the Army as a whole had been placed upon a solid and systematic basis.

Commandeering.—During the latter part of 1917 and the first part of 1918, it became necessary for the War Department to exercise the right of requisition to a considerable extent in order to secure promptly supplies and equipment and other property needed for war purposes. Great confusion existed in connection with such seizures. Adequate records were not maintained and complete reports could not be secured without months of investigation. Property was requisitioned at the request of the War Industries Board for private manufacturers without the knowledge of any department or bureau of the War Department, and by reasons of incomplete reports and in some cases loss of original documents the owners of property were at times deprived for an unreasonable time of just compensation.

The matter became acute, and in February, 1918, the Secretary of War instructed the Director of Purchase and Supply to make a complete report on all property requisitioned by the War Department. A partial report was made on March 1, 1918. On March 22, 1918, General Orders, No. 27, was issued, directing that in order to establish uniformity of procedure in requisitioning and commandeering property and to insure consistent consideration of the questions arising thereunder the Director of Purchase and Supply should:

- (1) Sign all requisitions and compulsory orders by direction of the Secretary of War.
- (2) Promulgate rules, regulations, and instructions with reference to the preparation, application, or use, issue, service, and recording of requisitions and compulsory orders.
- (3) Formulate the methods of determining values of property taken and compensation to be paid therefor.
- (4) Authorize payment or other settlement for such property.
- (5) Require such reports to be rendered as, in his opinion, may be necessary.

The Commandeering Section was thereupon established and charged with the administration of (1), (2), and (5), above. This section was carried over through the various reorganizations which later took place.

On March 30, 1918, the Division of Purchases and Supplies issued its Order No. 1 prescribing regulations for the preparation, transmission, service, and return of requisitions and compulsory orders, reports thereon, and the determination of just compensation therefor.

On April 1, 1918, General Orders, No. 30, constituted the Board of Appraisers, charged with the duty and responsibility, primarily, of determining just compensation to be paid for all property taken or used by the War Department during the existing emergency.

The statutes under which property was requisitioned or secured on compulsory orders were as follows:

- (1) Section 10 of the food-control act, also known as the Lever Act (H. R. 4961, public No. 41), approved August 10, 1917, author-

izing the requisitioning of foods, feeds, fuels, and other supplies necessary to the support of the Army or the maintenance of the Navy, or any other public use connected with the common defense, and the requisitioning of storage facilities for such supplies. The procedure under this statute was termed "requisitioning" and applied to existing property of the character indicated.

(2) Section 120 of the national-defense act (H. R. 12766, public No. 85), approved June 3, 1916, authorizing the placing with any manufacturing establishment of compulsory orders for the production of products or materials of the nature and kind usually produced or capable of being produced by such firm on the payment of just compensation.

The Commandeering Section was charged with responsibility as follows:

(1) To establish the records of all transactions which occurred prior to March 22, 1918.

(2) To exercise administrative control over all subsequent transactions and in so doing to take action as follows: (a) Standardization of administrative methods; (b) consistent consideration of the policies of the War Department and of the local questions involved with respect to taking property by summary process; (c) the compilation of complete statistics; (d) the completion of files to be available after the war for use in such litigation as may ensue.

Board of Appraisers.—In close connection with the work of the Commandeering Section was that of the Board of Appraisers. This board was established and its powers and duties defined by General Orders No. 30, War Department, April 1, 1918. The board was constituted of five members, each having rank of lieutenant colonel. The board had also a judge advocate with similar rank and a recorder with the rank of major.

The primary function of the board was stated as follows:

To determine, by appropriate methods, just compensation for property of whatever kind, real, personal and mixed, or for use, possession or occupation of any such property, (1) which shall hereafter during the existing emergency be ordered, requisitioned, commandeered, or otherwise summarily taken over according to law, through, by or by direction of the Secretary of War for the direct and special use of the Army; or (2) which has heretofore, during the present emergency, been thus taken over and the determination of just compensation for which has not been concluded, or is not under consideration by a special board of assessors.

The use of the requisition process by the bureaus in the early months of the war was attended by uncertainty and confusion, by diversity of practice, and by a lack of records which subsequently made the work of the Board of Appraisers very difficult. In many instances it was difficult even to determine just what property had been taken and by whom it was owned.

For the purpose of making an award it was found by experience that little or no reliance could be placed on the formal receipt executed by the officer serving the process and indorsed on the back of the requisition. In some cases, the organization issuing the requisition process failed to understand that it was without authority to make payments. Consequently, inquiry was necessary in every case as to whether payment had been made in whole or in part. It is obvious from this recital that, in the matter of commandeering and

appraisal, the system of independent army bureaus was the cause of a great deal of difficulty and uncertainty in regard to obligations incurred by the Government. With supply in the hands of a single purchasing agency the situation would have been quite different.

Boards of Contract Review.—On June 14, 1918, a Surveyor of Contracts was appointed by the Secretary of War. The Surveyor of Contracts had close relationship with the Director of Purchase and Supply, and in the reorganization of the Purchase, Storage and Traffic Division he was placed in charge of the Purchase Branch of that Division in addition to performing the duties of his original office. His first duty as Surveyor of Contracts was to establish in each supply bureau a Board of Contract Review, charged with duties as follows:

1. To approve or disapprove of the final form of proposed purchase transactions, bearing in mind particularly the necessity of protecting the interests of the Government as to price, terms, and conditions in the following classes of cases: (a) All awards over \$5,000; (b) all cost-plus transactions; (c) all awards where in cases of formal competitive bidding the award was recommended to anyone other than the low bidder; (d) such other classes of cases as the board considered desirable, or as might, from time to time, be designated by higher authority.

2. To consider questions of purchase and contract policy within the bureau.

These boards generally consisted of five members, including a representative of the Finance Section. Minutes were kept showing the action taken at each meeting, and copies thereof were originally transmitted for scrutiny to the Surveyor of Contracts and later to the Purchase Branch.

Such a board was already operating in the General Engineer Depot. Similar boards were established in the seven other supply bureaus during the period from July 8 to July 26, 1918, after conferences between the Surveyor of Contracts and the supply bureaus affected. On August 16, 1918, Supply Bulletin No. 21 on "Boards of Contract Review in Supply Bureaus" was issued, giving official recognition to what had been accomplished.

These boards proved of great value in scrutinizing all transactions of importance before they became effective, and in carrying out, in the supply bureaus in uniform and consistent manner, the contract and purchase policies established by the department.

The local boards having all been organized, the Superior Board of Contract Review was constituted, consisting of the Director of Purchases and Supplies as chairman, the Surveyor of Contracts, and either the chief procuring officer or a member of the Board of Contract Review of each supply bureau. Generally, although not in every instance, the chairman of the local Board of Contract Review represented the bureau on the superior board. The personnel of the superior board varied from time to time as reorganization took place in the Purchase, Storage, and Traffic Division.

The Superior Board considered the form and policy of contracts and other matters referred to it by the various bureaus and higher authority, and in general acted in an advisory capacity on the contracting and purchasing policy of the War Department. Among the more

important matters on which the board made its recommendations were the following:

1. Uniform contract provisions: On May 31, 1918, the Director of Purchase and Supplies appointed a Committee on Contract Standardization, consisting of representatives of all supply bureaus. This committee was charged with the duty of considering and recommending contract provisions on all subjects normally covered in contracts of the War Department, with a view to the establishment, in so far as possible, of uniform contract provisions for the different supply bureaus of the War Department. On August 6, 1918, the committee presented its final report.

2. Cost-plus contracts.

3. Publicity of War Department contracts and awards.

4. Increased manufacturing facilities.

5. Discounts for prompt payment of bills.

6. Workmen's compensation insurance.

Supervision of purchase methods and transactions.—Considerable attention was given during May and June to the drafting of a form upon which the supply bureaus might make regular reports to the Purchase and Supply Branch of the essential features of certain kinds of contracts.

Supply Circular No. 46, issued on July 6, 1918, required the bureaus to forward regularly on the forms provided, abstracts of their contracts and orders in the following classes of cases:

1. All orders or contracts amounting to \$1,000,000 or over in estimated or actual value.

2. All orders or contracts of any amount placed on any other basis than that of a straight fixed price subject to no adjustments.

3. All orders or contracts of any amount involving the creation of any new or additional facilities.

When the Purchase Branch succeeded to the function of the Purchase Section, examination and action on these abstracts was a duty with which the Methods Section was charged.

These abstracts of contracts proved to be of very great value in the administration of the department's purchasing policy. Among the results accomplished by the inspection of purchase methods were the following:

Increased competition and publicity.

Development of new sources of supply.

Reduction in number of cost-plus contracts.

Reduction in number of contracts in which price was left open to future negotiation.

Reduction in number of contracts in which price was based on cost of first 10 to 15 per cent of article mentioned.

Effective administration of system of cash discounts for prompt payment of bills.

Sales of property.—Immediately after the termination of hostilities the matter of sale of surplus stocks of war supplies became very urgent. Discussion of this important matter will be given in its proper place. The question of sales of certain kinds had, however, been taken up at an earlier date. War Department Bulletin No. 50, August 31, 1918, provided substantially that supplies, the value of which exceed \$5,000 would not be sold by the bureaus unless the ap-

proval of the Director of Purchase, Storage, and Traffic had first been secured. The handling of such cases was a special duty with which the Methods Section of the Purchase Branch was charged. The work inaugurated in this way was a useful preparation for the very much more extensive work in connection with sales which developed after the armistice.

New facilities.—On September 16, 1918, there was established a unit for the purpose of scrutinizing the contracts theretofore made by the various supply bureaus of the War Department involving the construction of new facilities to be paid for by the Government. At the time the armistice was signed, detailed studies of a number of the more important contracts had been completed and steps were under way to secure a modification of these contracts in the interest of the Government. In performing this work, the Methods Section was in constant touch with the Director of Munitions and the Assistant Director of Munitions.

On October 21, 1918, the Methods Section was directed to make a thorough investigation into the methods employed by the various supply bureaus of the War Department to safeguard the interest of the Government with reference to the care and ultimate disposition of tangible property and other rights acquired by the Government incident to and in connection with contracts of the War Department for materials and supplies. Conferences were promptly held with the various supply bureaus affected and the collation of these data was well under way when the armistice was signed.

Standardization of matériel.—The bureau system of procurement had occasioned a great heterogeneity in Army supply which was a great source of expense and also wasteful of cargo space and labor. To a great extent it was capable of remedy by standardization of types and specifications. To accomplish this end a unit was set up. The work of this unit included the reduction, insofar as possible, of the numbers, sizes and types, also of shades, colors and finishes of articles purchased by the Army; the simplification and coordination of specifications of the various supply bureaus for the same article, and the preparation of new specifications where none of an adequate nature existed. The personnel of this standardization unit was small, for it availed itself of the assistance of a large number of representatives of the various supply bureaus, the Bureau of Standards, technical and scientific societies, the committee of the War Industries Board and the representatives of the industries affected. A large number of general committees and subcommittees were established for carrying on this work of standardization. These committees did a large amount of highly important work. As rapidly as their work of standardization was accomplished the new specifications were given to the bureaus and purchase under them was commenced.

It is impossible to give an adequate idea of this work of standardization in any other way than by a lengthy enumeration. An abiding conviction of the wastefulness of a system of uncoordinated purchase by separate bureaus could not be gained in any way better than by a detailed study of the conditions found to exist by the standardization committees and of the work done by them to remedy the situation.

A single instance will serve to illustrate what took place in innumerable cases and the possible savings involved. The subcommittee on standardization of hand tools and hand chests made a reduction in the number of general tool chests used by the various divisions in the Army from approximately 77 to 7 types which were smaller and less expensive than the replaced types. The subcommittee estimated the saving in cost and freight charges on one order alone of approximately \$5,000,000.

Contract adjustment.—For some time it had been evident that it would be of great value to establish in the War Department an agency with authority to determine promptly and without reference to legal technicalities such doubts, claims, and disputes as might arise under contracts of the War Department in cases in which the contractor and contracting officer were unable to agree. It was believed that the establishment of such an agency would be very desirable not merely for the determination of such doubts, claims, and disputes as might arise during the progress of the war, but also, very particularly, to determine such claims of contractors as might arise when, on the cessation of hostilities, it might become necessary for the War Department, in the public interest, to terminate large numbers of outstanding contracts and orders.

In suggesting to the Director of Purchase, Storage and Traffic standard contract provisions for insertion in the contracts of the War Department, the Superior Board of Contract Review gave particular attention to this subject and recommended the mandatory insertion in all contracts of the following provisions on "Adjustment of claims and disputes":

Except as otherwise specifically provided in this contract, any claims, doubts, or disputes which may arise under this contract, or as to its performance or nonperformance, and which are not disposed of by mutual agreement, may be determined, upon petition of the contractor, by the Secretary of War or his duly authorized representative or representatives. If the Secretary of War selects a board as his authorized representative to hear and determine any such claims, doubts, or disputes, the decision of the majority shall be deemed the decision of the board. The decision of the Secretary of War or of such duly authorized representative or representatives shall be final and conclusive on all matters submitted for determination: *Provided*, That where the decision is rendered by such representative or representatives, the Secretary of War may, at his option, either upon his own motion or upon petition filed with him by the contractor within 20 days after notice of the decision of such duly authorized representative or representatives has been served upon him, review the action of such representative or representatives and render his decision thereon. Any sum or sums allowed to the contractor under the provisions of this article shall be paid by the United States as part of the cost of the articles or work herein contracted for and shall be deemed to be within the contemplation of this contract.

These provisions were incorporated in Supply Circular No. 88. It was also anticipated that in the case of earlier contracts not containing reference to such adjustment of claims and disputes the contractors might nevertheless desire to avail themselves of the assistance of a board acting promptly and on equitable principles.

On August 29, 1918, the Secretary of War approved a recommendation of the Director of Purchase, Storage and Traffic that such a board be created and directed that the necessary steps be taken. On November 6, 1918, after certain difficulties incident to organization had been overcome, the War Department issued General Orders, No.

103, establishing in the Purchase, Storage and Traffic Division of the General Staff a Board of Contract Adjustment, constituted and charged with duties and vested with powers as therein described.

The board consisted of those members who were nominated by the Director of Purchase, Storage and Traffic and appointed by the Secretary of War. The members were commissioned as lieutenant colonels. The board was charged with the duty of hearing and determining all claims, doubts, and disputes, including all claims of performance or nonperformance, which might arise under any contract made by the War Department. The board was authorized to adopt its own rules of practice and procedure. Investigations might be conducted either by the board as a whole or by individual members or examiners designated for that purpose, but findings and decisions were made only by the board acting through a majority of its members. The findings and decisions of the board were final and conclusive, subject only to review by the Secretary of War.

It was assumed that in practically all cases contractors whose petitions were heard by this board and who received a fair and impartial hearing from the board would be satisfied with its awards and would thus be able to secure prompt payment of their claims without the necessity of availing themselves of the assistance of the Court of Claims.

While the establishment of this board would, in any event, have been regarded as a desirable and constructive step, it was a matter of fortunate foresight that it was established and ready for business prior to the time when the cessation of hostilities made it necessary in the public interest for the War Department to terminate large numbers of outstanding contracts and orders.

Commodities.—Very early in the war representatives of the various supply bureaus of the Army and of numerous subdivisions thereof found it desirable to get in touch with various committees and organizations set up by the Council of National Defense, the General Munitions Board, and the later War Industries Board, but the relations so established were haphazard and extremely unsatisfactory for the reason that they did not provide for a uniform presentation of the needs of the Army as a whole, for the respective supplies, materials, and munitions called for by the Army program.

Under the final form of organization taken by the War Industries Board, an elaborate set of commodity sections was created each under chairmanship of an expert with special knowledge of a particular commodity or type of industry. The fundamental responsibility for the planning of supply on a large scale and well in advance of developing means, as well as for such matters as the proper distribution of orders throughout an industry, rested with these commodity sections. The establishment of the Purchase, Storage and Traffic Division of the General Staff made it possible to systematize the contacts of the various parts of the War Department organization with these commodity sections.

Shortly after the creation of the Purchase and Supply Branch, a series of Army commodity committees was created to parallel and to function with the commodity sections of the War Industries Board. Each Army committee was made up of representatives from the various supply bureaus interested in the particular commodity in ques-

tion. The personnel of these committees was, in the first instance, nominated by the bureaus concerned. Each committee had as chairman a representative of the bureau whose interest happened to be the largest, and the men who served as chairman of these commodity committees served also as members of the respective commodity sections of the War Industries Board, where each represented the Purchase, Storage and Traffic Division—that is to say, the Army as a whole.

The personnel of these Army commodity committees consisted very largely of officers who had already been in contact with the War Industries Board organization—each, however, as the representative of a particular bureau or subdivision thereof. The new organizations without disrupting these valuable relationships already established, reduced them to a uniform system which furnished a stronger guarantee that the needs of the Army would be adequately presented and which immensely simplified the problem of the War Industries Board at its numerous points of contact with Army needs. General supervision over the work of the commodity committees was entrusted to the Supply Program Section and later to the External Relations Branch which succeeded it.

It is impossible within brief limits to give any adequate account of the extent, the character, or the importance of the negotiations carried on through the instrumentality of these committees and through the memberships of their chairmen on the respective commodity sections of the War Industries Board. A record of this work which is really the whole story of the economic mobilization of the Nation's resources, has been preserved in the minutes of the commodity committees and of the commodity sections of the War Industries Board. An account has also been given in final reports of the chiefs of the several committees and sections.

The original constitution of the Army commodity committees is referred to in paragraph 14 of Supply Circular No. 1, April 24, 1918. The duties of the committees and their chairmen were stated in Supply Bulletin No. 8, April 23, 1918, and restated with great elaboration in Supply Bulletin No. 22, August 28, 1918.

It was through the contacts of the chairmen of the Army commodity committees with the commodity sections of the War Industries Board that plans were worked out in amplification of detail to assist the Army through the facilities of the War Industries Board in meeting the urgent and rapidly changing needs of the Army supply program. If the United States should ever again be involved in a war comparable in magnitude with the recent war, one of the first steps which would need to be taken would be the reconstitution of a set of commodity committees similar to those which served the Army during the late emergency. This should be done in any event, whether or not an organization similar to that of the War Industries Board is to be created. The chaotic relationships which existed during 1917 between the various parts of the Army organization and the War Industries Board, as contrasted with the efficient mechanism finally devised under the Director of Purchase, Storage and Traffic, serves powerfully to establish the conviction that there should be no return to the former bureau system of Army supply.

Clearance.—During the early months of the war, no clear cut distinction between clearance, priorities, and requirements was devel-

oped. The General Munitions Board itself dealt with all three and sometimes "requirements" were spoken of as presented for "clearance," questions of "priority" also being decided by the board in connection with the particular transaction concerned. Later, however, much sharper distinctions emerged. Special committees of the General Munitions Board on priorities and clearances forshadowed the later War Industries Board committees on these matters. In general, the distinctions which finally developed were the following:

"Clearance" came to mean approval of a "schedule of immediate or prospective purchases." The "requirements" of the army or bureau for a given article or material came to mean its calculated needs stated in the form of a monthly schedule projected for a year or more into the future. The word "priority," which was originally applied at times to preference given as between two conflicting requests for immediate purchase, came finally to be disassociated from the idea of a particular contemplated purchase transaction, and was connected rather with preferential treatment to be given to a Government contractor in the matter of fuel, raw materials, labor, or transportation facilities to which he became entitled as against other contractors whose work was considered less vital to the Army program. As finally administered by the important Priorities Board it came also to cover the determination of preferences in the broadest aspects of the Government's conduct of the war.

In the present discussion of clearances the word is used as defined in the preceding paragraph. In the early months of the war conflicts speedily developed between the departments and bureaus of the Government in regard to purchases. In order to have these conflicts settled or prevented, the contemplated purchases were referred to the General Munitions Board for clearance and clearance was granted only after the conflicts had been adjusted. It was not long before shortages became so well known that a shortage list or clearance list was drawn up and it was arranged that the bureaus and departments should not place orders for items on this "clearance list" without first presenting the matter to the General Munitions Board.

In such negotiations the five original supply bureaus of the Army appeared independently before the General Munitions Board sometimes even asking that body to settle conflicts as between two supply bureaus of the Army. As the Army program developed in magnitude, purchases calling for clearance greatly increased in number, and it was finally a cause of great dissatisfaction in the General Munitions Board and the War Industries Board which succeeded it, that the Army did not have any concerted presentation of such matters.

One of the results which the Purchase, Storage and Traffic Division undertook to bring about was the unifying, for the Army, of requests for clearance. Accordingly, on May 25, 1918, Supply Circular No. 15 was issued, requiring the supply bureaus to submit all immediate requirements or prospective purchases of commodities included on the clearance list of the War Industries Board to the Supply Program Section, Purchase and Supply Branch, for presentation to the War Industries Board for clearance. It was required that such action be taken before negotiations of any kind were initiated with contractors. This latter requirement was in-

tended to make it possible to utilize the facilities of the War Industries Board to the fullest degree in the matter of obtaining advice or instructions as to the most suitable place for making purchases.

An Army Clearance Committee was organized, composed of the liaison officers or other representatives from the various supply bureaus. This committee met under the direction of a clearance chairman of the Purchase and Supply Branch. The procedure to be followed was still further elaborated in Supply Circular No. 48, issued July 17, 1918. This circular really gave formal expression to the practice of clearance as it had been developed during the intervening months. It reiterated the requirement that "schedule of immediate or prospective purchase" involving articles or materials enumerated on the clearance list of the War Industries Board should be submitted through the Purchase and Supply Branch for clearance and in no case direct to the War Industries Board. It added, however, to such prospective purchases those involving orders within the "congested" district as it had been defined by the Fuel Administration and also orders involving the creation of new facilities or the conversion of existing facilities.

Daily meetings of the Army Clearance Committee were held, at which conflicts or difficulties as between the Army bureaus were settled. After going through these processes the requests for clearance were transmitted by the Army clearance chairman to the Clearance Committee of the War Industries Board.

Clearance by the War Industries Board took one of the following forms: (a) Unconditional clearance; (b) clearance subject to restriction as to congested area; (c) clearance subject to restriction as to placing orders in centers short of power; (d) clearance subject to restriction as to congested plants; (e) clearance subject to restriction as to new plant facilities, or with suggestion as to existing plant capacity available for this class of work; (f) clearance disapproved; (g) clearance with definite allocation of the order to a producing firm.

The requests for clearance were submitted by the bureaus originally on various forms but subsequent to Supply Circular No. 48 on standard forms. One of these copies was held as a file copy by the Army Clearance Section—the other three, including the original, were transmitted to the War Industries Board. There the matter was usually sent through the clearance secretary of the War Industries Board Clearance Committee to the Commodity Section of the War Industries Board interested in the article in question. After action had been taken on the matter one copy of the clearance was retained by the Commodity Section, one by the clearance secretary, and the original was returned to the Army Clearance Section. This section noted upon its own file copy the action taken by the War Industries Board and forwarded to the supply bureau its original request, carrying a notation of the clearance action taken. The War Industries Board was allowed 48 hours in which to act upon requests for clearance. If action was not taken within this time the supply bureau was then at liberty to proceed with its negotiations for purchase.

The daily clearance meetings in the War Industries Board were abolished after the middle of July, because experience showed it to

be unnecessary for representatives of the different departments of the Government to hold a formal meeting each day for clearance duties. The reason for this was that the commodity sections of the War Industries Board had developed such efficiency and familiarity with their respective commodities, as well as with the needs of the Government departments and bureaus, that clearance came to be possible as a rapid routine action by these commodity sections, upon each of which it will be remembered the Army had its representative.

In carrying out this procedure, the War Industries Board notified all parties interested each day of the clearance requests received the day before. This gave an opportunity within the 48 hours for protest where serious conflict existed. As a matter of fact, protests became negligible in number because of the familiarity on the part of the commodity sections with the questions at issue.

On August 29, 1918, Supply Circular No. 82 restated the clearance process, making mention of the localities which were short of power and giving the clearance list of the War Industries Board as it stood at that time. By familiarity with the War Industry Board's practice, the Army clearance officer found that a great many requests for clearance were unnecessary, and with the permission of the chairman of the War Industries Board undertook to discriminate between the requests which should be submitted and those which need not be. About 50 per cent of the requests submitted by the bureaus were actually cleared by the Army clearance office and were returned to the bureaus on the same day. In such cases, copies were sent to the War Industries Board with the action noted. During the five months in which this system was in operation there was no case in which the War Industries Board objected to the action so taken. The whole mechanism of clearance was working so efficiently during the last months of the war that nearly 26,000 requests (nearly 95 per cent) were actually cleared within the 48 hours allowed.

Certain requests for purchase were "allocated" instead of being "cleared." This meant simply that the proper authorities in the War Industries Board determined the particular manufacturer concerned, who should handle the order. Requests for allocation of pig iron and steel were not handled through the Army Clearance Committee but through an office in charge of the chairman of the Army Committee on Iron and Steel.

Shortly after the signing of the armistice, by Supply Circular No. 123, December 2, 1918, clearance (including allocation) was abolished.

Purchase and rental of real estate.—To the middle of June, 1918, no corps or bureau had organized a real estate department except the Signal Corps and the Director of Storage, of the Storage and Traffic Service. On June 12, 1918, the real estate unit which became a part of the Purchase Section of the Purchase and Supply Branch was formed. This Real Estate Unit was organized in pursuance of a memorandum issued by the Assistant Secretary of War, dated May 20, 1918, reading as follows:

The office of the Director of Purchase, Storage and Traffic shall have sole charge of carrying out the purchase, lease, rental, condemnation, or requisitioning of real estate and of buildings for the use of the War Department, recommended by the Operations Division, General Staff, and all such questions shall be referred to it for necessary action after its approval.

As the Division of Operations and the Division of Purchase, Storage and Traffic were jointly interested in real estate matters it was necessary for them to agree upon a procedure for the routing of all papers. Such an arrangement was made and set forth in Supply Circular No. 32, June 22, 1918, and amplified shortly thereafter in Supply Circular No. 33, July 2, 1918. Under the terms of these circulars all contemplated purchases or rentals of real estate were to be submitted for the approval of higher authority through the action of the Real Estate Unit. As all of the business of this unit was performed for the supply bureaus this office was organized on the bureau basis. The following statement descriptive of the work of the Real Estate Unit is taken from a report of that office:

The functions of the Real Estate Unit in connection with the acquisition of real estate is as follows: In case a particular piece of property is desired by a bureau a request is addressed to the Purchase, Storage and Traffic Division asking that the property be obtained, stating the amount asked, either for rental or purchase, giving the reason for which the property is needed, and that the funds of such bureau or corps are available for the purpose. The proposition is then investigated by the unit, either by sending a representative to view and appraise the property, or by communicating with local appraisers known to the department, or requesting a local committee of appraisers representing the Real Estate Board of that particular locality. A recommendation based on the result of such investigation is then made to the Director of Operations and on receipt of his approval together with that of the Assistant Secretary of War when the proposition in the opinion of the director necessitates that approval, and this unit then proceeds in case of lease, to negotiate and prepare for the signature of the contracting officer of the bureau and the lessor, and in case of sale, obtain abstracts, forward them to the Judge Advocate General's Office for examination. After return from the Judge Advocate General's Office, the defects if any in the title are pointed out and steps taken to have them cured, and when titles are in approved shape, a recommendation is then made to the corps or bureau for which the purchase is being made that the funds be disbursed. In case a request is made for property on which no estimate of the rental or value has been made by the corps making the request, an investigation is made as to a fair rental or purchase value and a memorandum to that effect is made the corps, which in turn make the request as stated above. In case the section is unable to obtain the property at a fair value, or the owners are unwilling to negotiate, or there is a defect in the title, condemnation or requisition proceedings, as the case may be, are instituted by this section.

When the property can not be obtained at a fair market figure, or the title of the property is so involved that a merchantable title can not be obtained, or owing to the fact that the multiplicity of owners would entail great delay in obtaining possession, requisition, or condemnation proceedings are instituted, depending on the use to which the property is to be put. A request is made the advisory and consulting department of this section to prepare the proceedings. Under both proceedings immediate possession is given the Government.

The power to requisition which has been invoked, is granted in an act of August 10, 1917 (Public, No. 41, 65th Cong.), and an act of November 4, 1918 (Public, No. 233, 65th Cong.). The former applies to property needed for storage and the latter grants power to requisition for hospital use. * * *

Condemnation proceedings are initiated under an act of July 2, 1917 (Public, No. 26, 65th Cong.), as amended by an act of April 11, 1918 (Public No. 127, 65th Cong.). Other emergency condemnation laws have been passed but those cited are the most frequently invoked. Actual condemnation proceedings is in charge of the Department of Justice. * * *

In both requisition and condemnation proceedings possession is taken upon issuance of the requisition or petition.

With the exception of the Signal Corps, the Division of Military Aeronautics and the Bureau of Aircraft Production, there were no complete records of any corps or bureau of the military establishment and the aim of this section has been to prepare and obtain a record of the real estate activities of every corps or bureau and properly classify same. * * * This section has prepared a

statement showing the amounts and locations of the various leases arranged geographically. This is probably the most complete list of leases in existence and undoubtedly contains a large percentage, but there are undoubtedly many renewals of leases made prior to July 1, 1918, copies of which have never been sent to this section. In fact, it is doubtful in many cases whether renewals have been made notwithstanding the fact that the Government is in possession of the property. In addition to that there are many cases where the Government has taken possession of land or buildings without an agreement for either loss or purchase.

Already there has been a vast number of claims involving damages to real estate presented to this division and as far as possible these have been adjusted. However, there will be an ever increasing number of such claims. * * *

It will be seen from the foregoing account that there was a very real need for a unit which should handle real estate matters for all supply bureaus in accordance with a common plan and with the efficiency which is possible only through an office manned by qualified real estate experts. A great deal of trouble for all parties concerned as well as much expense to the Government was avoided through the creation and operation of this real estate unit.

Price fixing.—Speaking generally, it may be said that the War Department did not fix prices for the things which it bought. Procurement officers in the various supply bureaus made contracts in the ordinary way, the price being simply one of the terms of the contract.

It has already been explained that the War Industries Board, through its commodity sections and in other ways, furnished the means by which the War Department in its procurement operations could deal with an industry as a whole and in the most advantageous way. Through the War Industries Board also the purchasing of the Government, which originally had been carried on through the uncoordinated activity of the various departments and bureaus was reduced to a system under which the Government presented a united front in its purchasing activity in any given line, at least when difficulties of any kind were encountered. Price fixing was also a function of the War Industries Board, and one in which the War Department was very vitally interested, for if prices were too low production would be curtailed and if they were too high the Government would be subjected to unnecessary expense.

The War Industries Board had a Price Fixing Committee which included, in addition to its chairman, representatives of the Federal Trade Commission, Tariff Commission, Fuel Administration, the Army, and the Navy. There was also on the committee a representative of the agricultural interests of the country. This committee, while a part of the War Industries Board organization, reported to and was responsible to the President direct. As a rule, prices were fixed only where a considerable degree of scarcity existed. The interests of the Army were taken care of by its representative, who was attached to the Purchase Branch and also served as a member of the Board of Appraisers referred to above. In the handling of his work, the representative of the Army constantly had recourse to the Army Commodity Committees as the repositories of much information in regard to the particular commodities and industries concerned, and also as being in touch with the needs of the various Army bureaus in the matter of price connected with the purchases which they had to make.

It will be evident from the foregoing that in the matter of price-fixing as in so many other particulars the bureau system of procurement proved to be an imperfect mechanism under the pressure of world war. The situation called for a single agency to represent all the procurement activities of the Army.

Priorities.—In time of peace priority is purchased. An order for goods is generally accompanied by a stipulation as to when the goods are to be delivered. A sudden need can be met by the placing of a rush order. The early delivery so obtained is paid for in an increased price, and this increased price furnishes the motive which hastens the processes of production. Of course the added element of cost involved is avoided as far as possible by foresight by the careful calculation of future needs, and by the provision of production facilities designed as nearly as may be to meet the best calculations possible of those needs. The purchase of priority is thus reduced to a minimum, but nevertheless it is a familiar aspect of industrial activity.

The breaking out of war created enormous and sudden new demands for the numberless things involved in the great program of supply which the war necessitated. As speed was the essence of the emergency, a condition immediately arose in which priority was insistently demanded on all sides. And at the outset, in accordance with the nature of the situation, priority was paid for by the offer of increased prices—in some cases prices extravagant in the extreme.

In this early competition for priority the departments and bureaus of the Government engaged in conflict with each other, with results which immediately cried for remedy, but for which remedial mechanism was not easy to devise. At an early date the Council of National Defense, it will be recalled, had created the General Munitions Board and various committees, a part of whose work was the settlement of conflicts in the matter of purchase requirements as between the various purchasing agencies of the Government. Out of the activities of the General Munitions Board emerged the Clearance Committee and the Priorities Committee, which evolved later into the similar committees of the War Industries Board.

These committees, as already explained, were composed of representatives of the various departments and bureaus of the Government, and of the major industries of the country. Each department and bureau representative by the nature of things was anxious to promote the particular part of the war program with which his bureau was charged. It might be supposed that each department and bureau would have recognized the importance of the program of the others, and would have refrained from insistence upon its own. Such was very far from being the situation in the early months of the war. Each procuring agency was responsible, not for the synchronized movement of the supply program as a whole, but for its own individual task. Before the development of a tested and dependable mechanism of coordination, the presentation of the conflicting supply requirements frequently degenerated into a contest of wits and a struggle for advantage instead of a cooperative effort for the best composite result. In such a game if each department and bureau plays a lone hand, some are bound to be more successful than others and the even balance of the supply program as a whole, so essential to

success, is not accomplished. Cooperation can be obtained only when it is thoroughly understood that individual interests must be subordinated for the good of the whole and when a proper mechanism is devised for making such a purpose effective.

In the early competition for materials, supplies, facilities, fuel, labor, power and transportation, the Army did not enter with united forces. Each of its supply bureaus had its own representatives and urged its own claims. Even as between parts of the same bureau conflict of interest frequently arose.

Priority was uppermost in the minds of all. With supplies known to be limited, the struggle to obtain them was general, and early deliveries were much in demand. Out of the conflict there gradually emerged a system, and this system was improved and perfected until it became the central medium for coordinating the Army program as a whole.

The plan evolved included a graded system of priority certificates for work of different degrees of importance, a classification of industries in accordance with their relative importance in the conduct of the war, and even a rating of individual plants as higher or lower in importance than the average of the industry in which they belong. Finally automatic features were introduced into the system, under which the industry of the country very largely regulated itself under general principles and classifications which the several plants could apply in the internal scheduling of their own activities, and in their relationships with each other.

The general aspects of this system were within the jurisdiction of the powerful and important Priorities Board. Its application in the field which lay within the jurisdiction of the War Industries Board was the function of the Priorities Committee. The Priorities Board consisted, in addition to the priorities commissioner and the chairman of the War Industries Board, of either members of or important officials in the Railroad Administration, Navy, Army, Department of Labor, Allied Purchasing Commission, Fuel Administration, Food Administration, Shipping Board and War Trade Board. Obviously a board of this composition was capable of determining the broadest aspects of priority with which the war program as a whole was involved. With the broad principles so determined the various departments severally applied them, each within its own jurisdiction.

One of the tasks of the Purchase, Storage and Traffic Division was the development of a priority system for the Army. This included both the settling of priority questions as between the various supply bureaus of the War Department and the single representation of the War Department in priority matters in the forum of the War Industries Board. The representative of the division was detailed for duty in the Purchase and Supply Branch.

For the purpose of outlining and explaining the whole matter of the handling of priority requests, Supply Circular No. 50, dated July 17, 1918, was issued to the bureaus. This provided for the creation of a priorities committee within each supply bureau. Briefly, conflicts within a bureau were to be settled by the bureau committee; the requests were then to be transmitted to the Army priorities officer, and after conflicts between bureaus had been resolved, the requests were to be put through the regular procedure of the Priorities Committee of the War Industries Board.

The system thus set up worked with great efficiency. As priorities work went forward, both general principles and details of application were developed to an increasing degree of perfection. At the end of hostilities practically all the industries of the country were operating under priority schedules which kept their entire activities in pace with the progress of the Army program as a whole.

Replacements and allied relations.—When the Purchase and Supply Branch was created it was found that there was great need for systematizing certain of the supply relations of United States with England and France. From both of these countries purchases of war supplies were being made, and in many of the agreements the obligation was incurred of "replacing" the amounts of raw material involved in the supplies bought. Sometimes the replacement was in kind; in other cases different arrangements were made.

Since the negotiations were conducted by the various supply bureaus it had come about that there was not in existence anywhere any complete record of the nature and extent of these obligations. A Replacement Section was therefore established to supervise the various obligations involved in meeting the replacement obligations.

The carrying out of the task brought into the Replacement Section a considerable volume of business relating to purchase from and sales to the allied nations which were not necessarily of a replacement character. At the time of the general reorganization this was recognized in Supply Circular No. 86, September 5, 1919, in which the section was renamed the Allied Relations Section, and its duties stated as follows:

Allied Relations Section.—To maintain relations and conduct negotiations with representatives of allied Governments in matters pertaining to supplies, and to supervise and direct the compilations and maintenance of records and accounts pertaining thereto.

The supervision of supply relations with the Allies was largely a task for a single officer. Conditions at the outset were found to be chaotic. These were speedily reduced to order, negotiations with the Allies put upon a thoroughly business basis, and systematic records compiled and maintained. Incident to these tasks general cable correspondence in regard to purchase and supply, and also special cable correspondence with the Assistant Secretary representing the War Department in the Interallied Munitions Council in Paris, were classified and indexed.

The work of the section exemplifies from another angle the desirability of a single service of supply rather than the bureau system as it existed at the beginning of the war. Within such a service it would be a simple matter to provide the mechanism for unified treatment of supply transactions with allied countries. When the matter is scattered over a number of bureaus the task is much more difficult. In fact to the very end it was difficult to get the bureaus to recognize and utilize the channel which had been created for the handling of negotiations of this character.

The consolidation of procurement.—The consolidation of procurement has already been referred to as a process which paved the way for the reorganization of the supply system in the latter part of the summer of 1918. Under the bureau system of supply as it had grown up there were many duplications in the procurement tasks of the

several bureaus. In many cases two bureaus or several bureaus were buying many articles so nearly alike that they could easily be standard. Disregard of such possibilities resulted in disorganization of the market, high prices, undue expense from multiplicity of types, unnecessary personnel, unnecessary accounting complications, and dual representation of requirements before the War Industries Board.

It was determined that the articles in question should be taken up one by one and a consolidation of procurement arranged. The general principle followed was that procurement should be centered in the bureau having the greatest interest.

Accordingly Supply Circular No. 2 was issued on May 8, 1918, outlining the general scheme of procurement consolidation. The following provisions were included:

Whenever it shall be decided to consolidate, under one bureau the procurement of any article or material now being procured by more than one supply bureau of the War Department, the following general instructions shall govern in such consolidations:

(a) Each supply bureau will continue to issue to the service the same articles as heretofore, these articles being delivered to it by the procuring bureau for such issue.

(b) Each issuing bureau will continue to be responsible for the determination of requirements for such articles.

(c) Each issuing bureau will continue to be responsible for the designs and specifications for such articles.

(d) Where the issuing is not the procuring bureau, the former shall make procurement requisition on the latter for its requirement, at the same time making transfer to the procurement bureau of the estimated amount of funds required for the purpose.

(e) In accordance with such procurement requisition, the procuring bureau will be solely responsible for making purchases, following production, conducting inspection, and making acceptance of and payment for the articles placed in its charge.

Upon the issuance of circulars designating procurement bureaus for given articles each issuing bureau shall submit to the designated procuring bureau a list of personnel, if any, engaged in the purchases, production, and inspection of such articles in order that proper recommendations may be made by the procuring bureau for the necessary transfers of personnel to handle the consolidated work.

This circular was followed by a long series of circulars, taking up articles one by one or in groups and providing for the consolidation of their procurement.

There are two outstanding facts in regard to the consolidation of procurement which call for comment. The first is that many troublesome issues arose in connection with interbureau procurement requisitions. The difficulties were not all clearly envisioned in advance, and perhaps could not have been. The result, however, was that there were many complaints, and the impression was made that action was taken too hurriedly, without adequate provision of the necessary mechanism for making consolidation effective and smooth. The interbureau procurement requisition became a point of complaint around which could center the widespread opposition to the general process of supervision and centralization which was going on. A great deal was made of the contention that the procuring bureau did not properly look after the procurement requests of other bureaus.

The second fact is that when the process of consolidation by articles was complete the Quartermaster Corps was procuring by far the larger number of articles in the Army program. As a very natural

result this corps became the nucleus around which was gathered the great bulk of the procurement of nontechnical articles by the general reorganization of the latter part of the summer.

The consolidation of procurement was an activity of the Purchase Section of the Purchase and Supply Branch.

Production.—The three phases of procurement which had been formulated were requirements, purchase and production. The particular task of the Production Section was to compare the progress of production with requirements, and to devise the necessary measures for expediting production where it seriously fell behind.

There were already elaborately organized production divisions in the supply bureaus charged with exactly the same responsibilities. It may be held that the primary responsibility for production lies with the procuring officers. Contracts should be placed where they can and will be fulfilled on schedule time. In such a view the procurement divisions had themselves a supervising function. The Production Section of the Purchase and Supply Branch therefore had the task of supervising other supervising bodies. There was, however, plenty of work to be done under the head of production, and the problem of accomplishing production had no end.

The organization of the Production Section was not hastened, as it was felt that its task followed in chronological order after the statement of requirements and after the purchase program was well in hand.

One of the undertakings of the Production Section was a study of the organization and operations of the production agencies of the bureaus. The studies were embodied in a set of reports, but they did not lead to the adoption of a definite or comprehensive program of production supervision. In lieu of such a program matters of production were handled as individual problems. A comprehensive program for the expediting of production was still in progress when the armistice was signed.

Finance.—At the outbreak of the war each of the five supply bureaus had its own disbursing officers and its own system of fiscal accounts. These systems were entirely independent of one another and received almost no outside supervision aside from occasional inspection of disbursing officers' accounts by representatives of the Inspector General's Department and review of appropriation estimates by the Chief of Staff and the Secretary of War.

In addition to the financial activities of the supply bureaus accounts were maintained and funds disbursed by the General Staff Corps, Militia Bureau, Inspector General's Department, and the office of the Secretary of War, for maintenance and miscellaneous purposes.

In other words, there were 10 different agencies in the War Department which were handling funds. There was also a Division of Requisitions and Accounts under the Assistant and Chief Clerk in the office of the Secretary of War which served as the connecting link between the Treasury Department, the War Department and the finance sections of the various bureaus. All appropriations, all requisitions for funds on the Treasury and all notifications of the final approval of accounts by the Treasury passed through this division, which maintained a set of ledgers showing for each appropriation the amounts allotted to the various bureaus, the amounts with-

drawn from the Treasury by disbursing officers and the amounts actually disbursed as approved by the Treasury. It also passed on printing and binding requisitions and transmitted them to the Public Printer and made allotments to the various bureaus under the War Department appropriations for printing and binding. It did not, however, exercise any control over the expenditure of funds placed to the credit of the bureaus or over the accounting methods used by them, nor did it attempt in any way to coordinate their activities.

Army Regulations, paragraph 740, provide that:

The supply, payment, and recruitment, of the Army and the direction of the expenditures of appropriations for its support are by law intrusted to the Secretary of War. He exercises control through the Chief of Staff and the bureaus of the War Department. He determines where and how particular supplies shall be purchased, delivered, inspected, stored and distributed.

As a matter of fact, control of appropriations by the Secretary of War was exercised almost wholly through delegated authority. At the beginning of each fiscal year the Secretary, as required by law, apportioned each appropriation so as to prevent undue expenditures in the first part of the year. After this apportionment had been made and the appropriations placed to the credit of the various bureaus, practically complete control over their expenditure was exercised by the bureau chiefs. Matters of special importance or upon which the Secretary had expressed a desire to pass judgment personally were returned to him for action, but as a general rule final decisions as to the purposes for which an appropriation was to be used rested with the chief of the bureau, in accordance, of course, with the terms of the appropriation. Except on special request, the only financial report submitted regularly to the Secretary of War was the annual report from each bureau stating the amounts expended under each appropriation and, in a general way, the purposes for which they were used. There was, therefore, little or no supervision or coordination of the financial activities of the bureaus.

The great bulk of the War Department funds was naturally handled by the five supply bureaus, each of which had its own finance section. The organization and functions of these sections varied greatly. Terminology employed, forms used, methods of procedure followed, and the character of the records maintained differed widely. There was no uniformity of classification as to the exact purposes for which funds were spent. As a result it was impossible without going through a mass of individual vouchers to determine the total expenditures of the War Department for special items, or, in some cases, the itemized expenditures of a single bureau. Proper accountability; the preparation of appropriation estimates; the recording, filing and execution of contracts; the settlement of claims, etc., were handled by the finance sections of some of the bureaus but not by others. This lack of uniformity undoubtedly came about as a result of years of independent development. So long as the bureaus acted in financial matters as a set of loosely related units, this was not, perhaps, a particularly serious situation. As soon, however, as an attempt was made to unify the supply system of the Army and to get them to doing business together, it formed an almost insuperable obstacle to effective coordination.

Comparatively few important changes occurred in the financial system of the War Department during the first nine months of the war. One disbursing and accounting agency was added to those already in existence through the creation of a finance section in the office of the Provost Marshal General to care for the appropriations made for that office. The finance sections in the supply bureaus expanded greatly in size as a result of the material increase in their activities. No attempt was made to supervise the financial activities of the bureaus or to coordinate their methods and records, largely because no steps had been taken toward the consolidation of procurement.

The Director of Purchase, whose office was created January 11, 1918 (later Director of Purchases and Supplies), established a unit known as the Fiscal Section "for supervising the preparation of financial estimates and expenditures of appropriations." Some attention was given by this section to the matter of estimates for appropriations, but nothing in the way of standardization appears to have been accomplished.

The report of the Committee of Three already referred to included among its recommendations provision that the Office of the Director of Purchases and Supplies should have authority:

To provide an accounting control section which shall standardize accounting and fiscal methods and reports of the several bureaus, analyze, and consolidate them, showing at all times the state of the finances of each department and of the War Department as a whole * * *.

In order to carry out these functions, the committee recommended the creation of a finance section as one of the main divisions in the Office of the Director of Purchases and Supplies. By the time the committee's report was rendered the Purchase, Storage and Traffic Division had been formed, so that when the Finance Section was finally organized it became a part of the Purchase and Supply Branch of that division. No definite order creating the Finance Section was made but it was organized on May 8, 1918, and continued substantially unchanged until the creation of the Accounts Department on August 27, 1918.

During the intervening months much in the way of preliminary surveying of the fiscal system of the Army was accomplished and the ground was laid for the coordination of finance which came later. A great deal of this work took the form of bringing together in an informal way the chiefs of the finance sections of the various supply bureaus for the purpose of familiarizing them with each others' methods and problems with a view to securing their assent to the processes of standardization and coordination.

Supply Circular No. 12 of June 8, 1918, promulgated instructions governing uniform procedure in the consolidation of procurement. It included provisions outlining the method to be followed in the transfer of funds under interbureau procurement requisitions.

This order was closely followed by Supply Circular No. 19 of June 10, 1918, in regard to the standardization of accounting methods. This circular charged the Finance Section of the Purchase and Supply Branch with the duty of standardizing and coordinating all fiscal accounting methods in the several bureaus, and provided that no change in existing accounting methods should be made until approved by the Finance Section. Work upon the system of uniform accounts was begun immediately, but was not completed until a later period.

During the latter part of August, 1918, the work of supervising the classification and compilation of all estimates and appropriations, including supplemental and deficiency estimates to be submitted by the War Department during the fiscal year 1919, was taken over by the Finance Section by order of the Secretary of War, which relieved the Assistant and Chief Clerk of this duty.

The tasks which devolved upon the Finance Section were among the most difficult in the whole problem of coordination and furnish the strongest illustrations of the vital necessity for the establishment of that factor in the organization of the War Department if it is to function as an efficient machine. The work of the Finance Section of the Purchase and Supply Branch can not be measured in terms of concrete results, for its accomplishments consisted chiefly in preparing the foundations, in the face of the opposition of a decentralized and disorganized system firmly entrenched by years of independent growth, for the building later of a centralized department of Army finance. This department will be treated separately in a later part of the report.

THE EMBARKATION SERVICE.

In the foregoing pages the supervision of supply activities in all its ramifications has been referred to. In addition to the fundamental problem of getting supplies actually into existence there were other services just as vital in securing the proper handling of those supplies and carrying them promptly and safely to their ultimate destinations, whether to the firing line in France or the training fields of the United States. The histories of these services can be given in distinctive and unified accounts, as the subsidiary services were affected much less by the reorganization than the fundamental service of supply. The first of these in point of establishment and in many ways in point of importance was the Embarkation Service, which directed the flow of supplies overseas.

Transportation control prior to the war.—Prior to the outbreak of the war and during the first three months of hostilities, the movement of troops and supplies was handled through the land and water branches of the Transportation Division of the Quartermaster Corps and through transportation officers of the various corps. The Quartermaster Corps was highly decentralized and transacted local business at any point through the nearest depot quartermaster. There were depot quartermasters at each of the principal ports. There was also at each important port a general superintendent of Army Transport Service charged with handling the operations of transports and responsible to the local depot quartermaster.

The movement of supplies and troops was carried out as follows:

The commander of a detachment of troops to be transported applied to the nearest depot quartermaster for transportation in accordance with his orders, and the depot quartermaster, acting in this capacity, under the guidance and instruction of the Transportation Branch, procured the necessary transportation. The officers of the division in charge of land and water transportation cooperated closely and made whatever arrangements were necessary for the movement of troops through to their destination, whether this involved only land transportation or water transportation, or both.

There had been formed by the American Railway Association a board called the Railway War Board, for the purpose of coordinating the railroads in so far as they were called upon to move Government troops and property. This board had a general agent at each camp and embarkation depot to represent the railroads, and the depot quartermaster in making arrangements for the transportation of troops dealt directly with this general agent of the railway association.

The officer responsible for the movement of freight in any bureau of the Army, if the movement was to be by land only, made his contract direct with the carrier and delivered his goods direct to it. At the point of destination, the recipient of the goods notified the local depot quartermaster, through whom payment for the shipment was made. If the goods were to be transported by water, or by land and water, the arrangements for transportation by water were made by the local general superintendent, Army Transport Service, where the water shipment started, under guidance and instruction from the Transportation Division.

The duties of the Water Transportation Branch at the outbreak of the war were to supervise the entire operation of the Army Transport Service. Many of these duties were performed in the first instance by the superintendent of Army Transport Service; others, such as allocating vessels to different services, drawing plans and estimates for construction and repairs, etc., were performed by the Water Transport Branch itself. The duties of the branch may be outlined as follows: (a) Operations—it operated seven Army transports to and from the Philippines, Alaska, Panama, and Cuba, and the harbor facilities, etc., therefor were managed by the superintendents; (b) construction; (c) personnel; (d) finance.

The work of the Land Transportation Branch was to supervise land movements of troops and quartermaster supplies. Many of the arrangements for such movements were made by local depot quartermaster officers, except where the amount of transportation required was large, in which case it was taken up by the Land Transportation Branch direct.

Organization of ports of embarkation.—It was soon foreseen that peace-time machinery and methods would be inadequate to handle the problems of transportation which would develop. The first necessity appeared to be for the establishment of administrative organizations at the ports along the seaboard through which the greater part of the stores of supplies must pass on their way to Europe.

Thus, on June 20, 1917, the Quartermaster General submitted a report recommending the organization of "New York and Newport News, and such other ports as may be necessary, as ports of embarkation." The port of New York was recommended for the transportation of troops and supplies and Newport News was suggested for use in the shipping of animals, forage, and heavy ordnance. It was also recommended that there be established an embarkation camp at New York sufficient in size to take care of one division, and that there be formed a depot for the accommodation of approximately 10,000 animals, with camps and cantonments for the supply companies of a division.

On July 2, 1917, the assistant to the Chief of Staff submitted a memorandum emphasizing the lack of coordination then existing between the agencies performing embarkation functions, urging the need of the immediate organization of the ports of embarkation and recommending the appointment of a "Supervisor of Military Supplies."

All questions relating to place of shipment, priority and order of shipment, relative amounts, etc., to be determined then by the Chief of Staff after all data upon demand and supply are placed before him by the Central Coordinating Office, and requiring them (the chiefs of supply bureaus) to be guided as far as possible by the supervisor's advices as to the time of forwarding the supplies and their quantity, and absolutely as to the port of collection in anticipation of overseas transportation.

On July 5, 1917, the Chief of the War College Division submitted a report to the Chief of Staff embodying the recommendations of the Quartermaster General and the assistant to the Chief of Staff, except that in place of the Supervisor of Supplies, he recommended the appointment of a Chief of Embarkation. It is to be noted that at the time the first of these memoranda was submitted, on June 20, instructions had already been issued to the commanding general Department of the East to organize New York as a port of embarkation.

The first orders for the formation of a port of embarkation were under date of June 6, 1917, from the Acting Chief of Staff to The Adjutant General, containing the following paragraph:

The Secretary of War directs that the commanding general Eastern Department be instructed by wire to exercise the functions of commander of the port of embarkation, New York, until some line officer for such duty has been designated by the War Department; that he be directed to recommend a site in the vicinity of New York appropriate for location of a camp of concentration, in case such camp becomes necessary.

On July 3, the first commander of the port of New York was designated.

Newport News, Va., was organized by the commander of that port who was designated by a confidential order on July 7, 1917.

The first troops sent abroad were hospital units on commercial liners, but these were transported under the control of the Water Transportation Branch of the Quartermaster Corps, acting through the general superintendent of Army Transport Service, New York. The arrangements for the first convoy were made after the order directing the organization of the port, but the influence of this order had not yet been felt.

The duties of a commander of a port had been formulated long in advance in paragraph 257 of the Field Service Regulations and were as follows:

- (a) To arrange camps for the troops at or near the port of embarkation.
- (b) To accumulate supplies for the maintenance of the expeditionary force while at the port of embarkation and until its arrival at the port of debarkation.
- (c) To accumulate and ship the necessary supplies for the maintenance of the troops at the oversea base pending the organization of the supply service in the theater of operations.
- (d) To make all detailed arrangements for the prompt detraining of troops and material and for their subsequent embarkation.

(e) To see that the ships furnished him by the Quartermaster Corps are properly fitted out for use as transports.

(f) To operate and maintain the military shipping and traffic between his port and the oversea base through a superintendent of transport service, who is a member of his staff.

(g) To command all administrative groups assigned to the port of embarkation and to be directly responsible to the War Department for the efficient and economical direction of their operations.

The commander of the port of embarkation, his staff, and personnel are not subject to the orders of the commander of the troops at the concentration camp, nor the latter commander to the orders of the former. The commander of the port of embarkation prepares the schedules for the embarkation of troops, material and supplies on transports, and has charge of such embarkation. The commander of the camp issues the orders necessary to carry out the schedules and details a staff officer to assist the commander of the port of embarkation during the loading. Under all conditions these schedules will be made only after consultation with the superior commander of the troops to be embarked. When a landing or disembarkation in the face of opposition is anticipated, the distribution and plan of embarkation will be made to suit the tactical requirements of the situation, and in case of a difference of opinion, the final decision will rest with the commander of troops. When no opposition to landing is expected, the final decision will rest with the commander of the port of embarkation. Cordial cooperation between these commanders is essential to the efficient performance of their respective duties.

By virtue of paragraph (g) above, the superintendent of Army transports at the port was placed under the jurisdiction of the commanding general of the port.

The port of embarkation at New York was the principal port for the shipment of troops during the war (88 per cent of the troops passed through this port). It included the terminals at Newark, Hoboken, and Brooklyn, and to facilitate shipment of troops from the port there were designated three embarkation cantonments, Camp Merritt with a capacity of 38,000; Camp Mills, 40,000; and part of Camp Upton, 18,000.

The port of embarkation at Newport News, including Norfolk, besides being the port for shipment of much of the freight and a small proportion of the troops, was the point of shipment for animals. This port included Camp Stewart with 25,000 troops, Camp Hill 18,000 troops, a quartermaster terminal at Sewell Point, an ordnance depot at Pig Point, a Signal Corps station at Morrison, Va., and extensive Engineer terminals and general warehouses.

Overseas expeditionary depots were established at Boston, Philadelphia and Baltimore. From Savannah, Jacksonville, Mobile, Gulfport, New Orleans, Galveston, and Lake ports shipments were made from time to time.

Prior to the establishment of the Embarkation Service there were shipped to France some 25,000 troops, including Gen. Pershing and his staff, base hospital units, railway engineer regiments, Field Artillery regiments and aviation detachments.

Formation of Embarkation Service.—The Embarkation Service was formed by General Orders, No. 102, War Department, August 4, 1917, which gave its purpose as follows:

The function of this section is to coordinate all shipments of munitions and supplies of every kind and all troop movements whose ultimate destination is Europe, and to advise and assist the Chief of Staff in reference thereto. It will have direct supervision, under the Chief of Staff, of all movements of supplies from points of origin to ports of embarkation, will supervise the operations of the latter, and will control the employment of all Army transports engaged in the trans-Atlantic service and such commercial shipping as may be used to supplement that service. It will arrange with the Navy for convoy service.

It is made the duty of all chiefs of supply bureaus to keep the Chief of the Embarkation Service informed fully of the condition of supplies in their several bureaus, and to this end they will correspond directly with that officer. Direct correspondence between the Chief of the Embarkation Service and the commanding officers of ports of embarkation is authorized. Copies of all requisitions, requests, and information of every character received from the commanding general of our forces in Europe, or his subordinates, which bear upon reinforcements or renewals of supplies will be transmitted to the Chief of the Embarkation Service; and in general, under the supervision of the Chief of Staff, this officer is charged with the duty of arranging that all supplies for our forces in Europe shall be forwarded in the most expeditious and convenient manner, and to that end he is authorized to call upon all supply officers for information and to exercise control in matters of shipment, both within the territory of the United States and in the overseas haul.

The Embarkation Service was the agency by which the War Department exercised its control over the ports of embarkation and all the other agencies of the War Department in so far as they were directly concerned with embarkation. At first the service occupied itself with controlling and supervising the ports to the end of coordinating them with each other and of meeting the cabled requirements, permitting the general superintendents of Army Transport Service at the various ports to continue to perform actual operations as theretofore, but gradually control was centered in Washington. The functions which the Embarkation Service performed at the beginning, either directly or through the general superintendent of Army Transport Service were: (a) To allocate the troops and freight to the various transport vessels; (b) to supervise the loading of the troops and freight; (c) to prevent the shipment of freight to the port before the port was ready to handle it; (d) to trace the movement of freight which was urgently needed for shipment.

The scope of its operations was indicated in an office order of February 16, 1918, dividing the work of the Embarkation Service primarily into those of a military and those of a commercial character as follows:

The activities of the Embarkation Service will be conducted by two operating divisions:

(a) Those of a purely military character under the commanding generals, ports of embarkation for the several ports.

(b) Those of a purely commercial character, having to do with operation, repair, coaling, supplying of ships under the administration and control of the Shipping Control Committee appointed by the Secretary of War.

Because of the fact that the actual work of handling the transports was done by the general superintendent, Army Transport Service, while the work was under the jurisdiction of the Water Transportation Branch of the Quartermaster Corps, and that this office became an integral part of the port of embarkation in effect reporting to the Embarkation Service, there was no break in the taking over of transport control. The Water Transportation Branch had a clear legal status, a technical organization, and a complete set of records. It should be said, therefore, that at this period the Embarkation Service performed certain of its functions through the Water Transport Branch. Among these functions may be included the chartering, financing, constructing, and repairing of vessels.

Aside from these duties which were performed by the Embarkation Service through the Water Transportation Branch, the division of duties between the two organizations was not functional but related to the destination of the troops and supplies. All troops and

supplies destined for the war zone were moved under the jurisdiction of the Embarkation Service. All other movements of troops and supplies were made, as stated above, either under the Transportation Division of the Quartermaster Corps, or, in the case of supplies, by the supply bureaus, either alone or in cooperation with the Transportation Division.

At the end of the fall, 1917, the situation at New York had become so tangled, due to the large number of allied and commercial shipments as well as United States military shipments that were being consummated through that port, that the Secretary of War took the action, in November, 1917, of appointing the War Board of the Port of New York. It was vested with full power and authority "to make rules and regulations for operating the facilities of the port; to determine priorities and to do what was necessary to promote the prompt and economical dispatch of the duties in and about the port." This body performed useful service in assisting to remove the congestion at New York. Its duties later passed to the Shipping Control Committee. This was a body appointed by the Secretary of War by letter of February 7, 1918, which defined its duties as follows:

1. To allocate the tonnage available at the port to the various uses.
2. To distribute the tonnage.
3. To arrange for exchange of ships for the War Department.
4. To load and unload.
5. To arrange for coaling, provisioning and repairing.
6. To manage the docks, piers, and loading facilities of the War Department and all ships whether of the War Department or not, while in the harbors.

Of these functions, the first three had been performed by the Ship Operations Branch of the Embarkation Service direct, and the last three had been performed by the general superintendent, Army Transport Service. The execution of these functions by the Shipping Control Committee was carried out in harmony with the Embarkation Service, through representatives of the committee at every port of importance. The committee performed a useful service in improving loading efficiency and thus reducing the stay of transports while in port.

The mechanism for arranging freight shipments at this time was as follows: The supply bureau having material to be shipped to the American Expeditionary Forces first obtained an authorization which was called a transportation release from the Embarkation Service officials, and then made its arrangements direct with the carrier, or if the shipment was large, with the agent of the American Railway Association. These transportation releases were at first granted by the commanding general of the port, but after October, 1917, by the Embarkation Service in Washington. The issuance of the release was contingent on the capacity of the port to take care of the shipment promptly, and the fact that the right to grant this permission was transferred from the port to the Washington office of the Embarkation Service is indicative of the extent to which the centralization of control took place.

In the adoption of the release system may be seen the first step toward the highly effective plan of traffic control which later solved the difficulties of congestion, both at the ports and on the railroads. This congestion had resulted primarily from the bureau system of

procurement, a system of uncoordinated purchases, of many premature and unnecessary shipments, of competition for transportation facilities in which shipments of supplies were not in any way synchronized or coordinated with the developing Army program, a system which inevitably resulted in an uneven and undirected outpouring of supplies from factories, shipments of many kinds of supplies in advance of current needs, inefficient utilization of cargo space, the clogging of port and storage facilities, and the jamming of traffic far inland from the seaboard.

The proper principle of control was struck in the establishment of the release system. The procuring bureaus were put under obligations to initiate shipments by rail for embarkation only upon release by the Embarkation Service, the release signifying that the supplies concerned could or would be adequately handled at the port. The system was extremely effective because it checked the causes of congestion at their sources—the points of origin of supplies. Unfortunately the obligations imposed were not always observed by the procuring bureaus and the Embarkation Service was at first without power to make its control mandatory. This became possible later, however, after the establishment of the Division of Inland Transportation, which, being an agency not only of the War Department but of the Railroad Administration as well, was able, through its transportation orders, to make the principle of control of shipments at points of origin mandatory upon the carriers.

Storage and Traffic Service organized.—In December, 1917, with freight congestion becoming daily a more serious problem, it was realized that a more comprehensive scheme for unified control of the movement of Army supplies was needed than had been included within the scope of the Embarkation Service. Accordingly the Storage and Traffic Service, which has already been described in some detail, was organized and to its director the Chief of the Embarkation Service was ordered to report. The appointment of a Director of Storage and Traffic brought under one jurisdiction the whole problem of the movement and handling of Army supplies from the time they left the factories to their landing in France or delivery to camps in the United States. On February 9, 1918, the powers and duties of the Director of Storage and Traffic were set forth in General Orders, No. 14, which reorganized the General Staff, made him one of the five assistants to the Chief of Staff, and charged him with:

(a) All movements of troops, as well as of munitions and of supplies of every kind, including raw materials and finished products, both during manufacture and after assembly, to points of embarkation, interior points and overseas points, and in and out of all storage.

(b) All inland traffic, embarkation service, and overseas service relating to the Army program, including the employment of all Army transports engaged in the trans-Atlantic service, and such commercial shipping as may be used to supplement that service, including all arrangements with the Navy Department for convoy service.

(c) Direct correspondence between the Director of Storage and Traffic and the commanding officers of ports of embarkation is authorized * * * in general, this officer is charged with the duty of arranging that all supplies for our forces in this country and in Europe shall be forwarded in the most expeditious and convenient manner, and to that end he is authorized to exercise control of Army shipments, both within the territory of the United States and as the same relates to the overseas haul.

The creation of the Storage and Traffic Service had the effect of setting up under the Director of Storage and Traffic a definite and comprehensive organization through which the Secretary of War and the Chief of Staff were enabled to control the whole intricate flow of Army supplies and to regulate all of its tributaries in accordance with the progress of the Army program. The Embarkation Service was already a going concern, and the creation of the Storage and Traffic Service made no immediate change in its organization, functions, or relationships. To carry out more completely, however, the broad powers of the Director of Storage and Traffic, the Division of Inland Transportation was created as coordinate with the Embarkation Service. Through it was issued the order to the newly Government-controlled railroads which required them to refuse shipment of supplies not requested on its order, which in turn issued upon the securing of an Embarkation Service release.

Jurisdiction over inland transportation had originally been vested in the Embarkation Service, but its efforts had been restricted to the control of shipments under the release system and the tracing of shipments of supplies for which there was urgent need for embarkation overseas. The consolidation of the railroads into a single system under Government control opened the way for a much more complete supervision of the shipment of supplies in this country by the Inland Transportation Division.

Reorganization of Embarkation Service.—The Embarkation Service maintained a singular continuity of organization and existence in a period when constant adjustment and readjustment was the rule. When the Storage and Traffic Service developed into the Purchase, Storage and Traffic Division in April, 1918, the Embarkation Service became one of the four main subdivisions of the division. When the latter organization was reorganized during the latter part of August, the Embarkation Service continued as one of the main operating departments.

Its internal administration also met with little change. The organization as given by the Chief of the Embarkation Service in a report to the Director of Purchase, Storage and Traffic included four subdivisions or sections, which, with their main functions, were as follows:

1. *Administration Section.*—In addition to performing usual routine services, operated courier service; transmitted sailings, cargo, and troop data to the Service of Supply by cable; had charge of baggage, remains, and effects; and of all records, including troop, cargo, and ship statistics.

2. *Passenger Section.*—Maintained records of all troop movements overseas and returning, including a log of each organization from date reported ready for overseas service by Operations Division, General Staff, until reported landed at European port.

3. *Ship Section.*—Maintained liaison with United States Shipping Board and Shipping Control Committee in keeping Chief of Embarkation advised at all times of ships available for troop and cargo service, and in making recommendations as to equipment, repair, and maintenance of ships in service and those that might be acquired.

4. *Cargo Section.*—Control over movement of supplies pertaining to the several supply bureaus from points of manufacture or storage to the seaboard for immediate loading or temporary storage, and of assignment of those supplies to ships for transportation abroad in order to meet schedules fixed by commanding general American Expeditionary Forces. Maintained close liaison with all supply bureaus and kept records of all shipments overseas pertaining to all bureaus. Also maintained liaison with Inland Transportation Branch in fol-

lowing up shipments toward the seaboard, in order to prevent congestion en-route and at the port, and to secure adequate stores at the ports for loading on ships.

It will be noticed that no provision was made in any of these sections for financing, chartering, or constructing and altering vessels. As has been pointed out, these functions were carried on by the Water Transportation Branch, during the greater part of the war period as a separate entity. In November, 1918, however, the Water Transportation Branch was assimilated into the structure of the Embarkation Service whose organization was altered somewhat in the process.

The Embarkation Service, as has already been pointed out, had developed a fairly permanent organization as early as December, 1917. From this time on it built up the tremendous working agencies at the two primary ports and the expeditionary depots at the other ports which made possible that never-faltering procession of men and munitions, so heartening to the Allies and so disconcerting to the enemy, across the Atlantic. It followed the movement of these troops and supplies from point of origin in this country to port in France.

In the matter of troops, the priority as laid down by the Operations Division of the General Staff was carried out by the Embarkation Service. As fast as troops were reported ready, the Embarkation Service took charge of the movement. The orders for the movement were written in the Embarkation Service and the Inland Traffic Service was requested to arrange for rail transportation.

After a division had been given its original order to report to a port, the details of the movement were then in the hands of the commanding general of the port who called in the various units as fast as he was able to receive them.

The overseas orders of all casual officers were also submitted to the Director of Embarkation and his approval and release obtained before the orders were published by the Adjutant General. This had the advantage, first, of affording an opportunity to check transportation requests and prevent officers from being given orders to go overseas without authority either from the commanding general of the Expeditionary Force or the Chief of Staff or the Director of Operations; second, of affording the Embarkation Service the opportunity of making the officers' transportation arrangements.

Every ship that could possibly be spared was negotiated for by the Director of Embarkation. His efforts brought forth ships from all nations and from all ports of the world. They were obtained upon numerous and various conditions of charter and hire. All were pressed into our service in the least possible time.

Direct communication was authorized between the Director of Embarkation and the Chief of Naval Operations, Navy Department. This enabled these two services, necessarily closely related, to work together with the utmost harmony and cooperation, to the end that the repairing, converting, conveying and provisioning of ships operated by the Navy was accomplished to the entire satisfaction of the Army.

One of the difficulties solved by the Director of Embarkation was that of maintaining secrecy in all of his activities. Practically every move made in his rapidly increasing organization required the utmost

secrecy. To accomplish this, all ships were designated by constantly changing codes, cables giving sailing information together with description of troops and cargo were sent through the secret channels of the Navy Department, and every order affecting the movements or locations of either troops or ships was handled most confidentially. It might be added that so well was this feat accomplished that the announcement of the safe arrival of the first million men overseas came as a complete surprise to the entire country. It was possible also for the sailing of troops to be terminated 11 days before the signing of the armistice without the fact coming to the attention of the public.

In the following up of the cargoes, a complete record of every shipment was kept in Washington from the time the article was reported ready and released to the Inland Traffic Service until it arrived overseas. Liaison between the supply bureaus and the Director of Embarkation was maintained at all times and a section in charge of the movement of the supplies of each bureau was established in the Embarkation Service. The system of releasing freight by the Embarkation Service assisted tremendously in clearing up the freight congestion which occurred in the winter of 1917-18.

The following up of all cargo destined for overseas was maintained by the Embarkation Service for its own benefit as well as for the benefit of the other bureaus of the War Department who were dependent upon these records. They showed the status of all shipments at all times, and furnished information for estimates, shipping schedules, and tonnage allocations, as well.

The outstanding achievement of the Embarkation Service was the bringing of order out of chaos in the situation which existed at the ports. In so doing it eliminated all congestion, made proper provision for the equipment of troops as they were sent overseas, brought into the service of the Army a very large increase in tonnage whereby the monthly number of troops transported was brought up to approximately 300,000, directed the transportation of all of the subsistence and supplies required for the overseas army and in so doing apportioned the available cargo space to the various goods to be transported so that, in so far as supplies were available, shipments were substantially in accordance with cable requirements. Such accomplishments would have been outside the range of possibility had arrangements for shipping been left to be worked out along independent bureau lines.

Transport fleet.—At the outbreak of the war our transport service consisted of few vessels; as a matter of fact, there were seven actually under the control of the War Department. Most of these were then operating in the Pacific. A start was made by chartering a few of the American merchant steamers immediately at hand, and by the end of June, 1917, there were in the service troop ships with a dead-weight of 46,000 tons and six cargo ships with a dead-weight of 48,000 tons. From this small beginning there was developed the trans-Atlantic fleet which, on November 1, aggregated 512 vessels with a total dead-weight of 3,251,000 tons. In addition to this a cross-channel fleet was built up numbering 104 vessels with an aggregate tonnage of 311,000, making a total fleet of 616 vessels.

In building up this fleet, the first great increment in the matter of troop transports came by the seizure and taking over of German

interned vessels, which entered the service during the fall of 1917, aggregating 460,000 dead-weight tons. In the spring of 1918 the taking over of the Dutch vessels gave the Army an additional 300,000 dead-weight tons.

Troop movement.—On June 30, 1918, 100 British and allied vessels were finally engaged in the transportation of the great American Army overseas.

The Embarkation Service sent overseas more than 2,000,000 men and approximately 9,000,000 tons of cargo over a line of communication 3,500 miles long, subject to constant attack by enemy submarines. Such a performance has not been excelled in any war.

Return troop movement.—When the armistice was signed the total troop capacity of American flag transports, under the control of the United States, was 111,783 men. It was quite evident that the War Department could not expect from the allied Governments the same assistance in the return of American forces that we had received in transporting them overseas, so it was necessary to devise other means of promptly bringing the American Army home.

Immediately following the signing of the armistice, steps were taken by the Director of Embarkation to increase the American transport fleet as rapidly as possible. The work of converting some 58 cargo transports was promptly undertaken; the Navy assigned battleships and cruisers for transport service; 10 German passenger ships were obtained and equipped for carrying American troops; and the War Department negotiated successfully with the Italian, French, Spanish, and Dutch for the utilization of suitable passenger vessels for the return of the American forces. These steps increased the troop fleet operating in the return of the American forces to a maximum of 173 vessels in service on June 23, 1919. This fleet was made up as follows:

	Number.	Capacity.
American flag transports.....	141	364,069
British.....	4	5,621
Italian.....	13	27,572
French.....	8	10,954
Spanish.....	4	4,185
Dutch.....	3	6,850
Total.....	173	419,251

The return movement reached its maximum during the month of June, when all records heretofore established were broken by the embarkation in French ports of 364,166, and the landing in American ports of 343,786.

With all the shipping that the Allies could muster during the emergency in the spring and summer of 1918, it was possible to transport only a little over 306,000 American troops in any one month. In spite of the fact that at the signing of the armistice on November 11, 1918, the American-flag transports of all kinds had a capacity of barely 110,000 troops per month, operated at maximum efficiency, yet it will be noted that during the month of April, 1919, there were transported on American-flag ships alone 246,209, and in June of the same year United States tonnage returned 327,654 American troops.

When this fact becomes fully realized in military and shipping circles, the real magnitude of our overseas transportation operations will be more fully appreciated. From November 11, 1918, to June 30, 1919, 1,608,873 of the American forces embarked from France, and during the same period 1,476,707 landed in the United States. On May 31, 1919, there were 180,681 troops on the water between France and the United States. This was the greatest number of troops on the water at any one time during the overseas operations. The part played by the original 19 German vessels taken over in the United States ports upon the declaration of war is shown by the fact that they alone transported to France an army of over half a million men, and up to June 30, 1919, had returned 409,516 of that number to the United States. In all, they transported safely, both ways, 931,619 of the American forces, and of this number the transport *Leviathan* carried 175,571.

THE INLAND TRAFFIC SERVICE.

The Inland Traffic Service formed the third great arm of the Director of Purchase, Storage and Traffic in carrying out his control of the supply activities of the Army. Its operations as the Inland Transportation Division have been touched upon in the account given of the Embarkation Service, with which it worked in close association in effecting the transportation of overseas troops and supplies to the seaboard. A more complete discussion of its development is necessary to a complete understanding of traffic supervision during the war.

Early transportation arrangements.—Previous to 1914, arrangements for the movement of troops by rail were made through direct negotiation with the carriers initiated by the depot quartermaster at the point where the movement was to start. When a crisis with Mexico threatened in May, 1914, and the port of Vera Cruz was occupied by the United States forces, the Quartermaster General, anticipating a possible heavy movement of troops, requested that the American Railroad Association appoint a representative in Washington, with whom the Quartermaster General might confer on the question of handling the anticipated large shipments of troops and supplies, so that the greatest possible cooperation between the Government and the railroads might be obtained. This request met with the approval of the railroads, but the emergency passed before definite action was taken. This may be considered the first foreshadowing of the later Embarkation Service and Inland Traffic Service of the War Department.

No further steps were taken for more than a year, when in October, 1915, the American Railway Association appointed a committee to confer with the Quartermaster General on the subject. This committee, composed of the presidents or vice presidents of several important railroads, in conference with the Quartermaster General, established a bureau to represent the railroads in the handling of War Department transportation, and developed a plan whereby railway representatives should be detailed at critical points to assist the War Department officials.

The Council of National Defense was formed August 29, 1916. In February, 1917, the American Railway Association, acting with the

approval of the Council of National Defense, appointed a committee called the Railway Committee on National Defense, to devise ways and means by which the railroads could most suitably cooperate with the Government in the event of a war with Germany.

In accordance with the recommendation of this committee, a permanent committee or board, which was later called the Railway War Board, was appointed, composed of representatives of the railroads, with a representative for each of the six territorial departments of the United States, taking upon itself the duty of directing the operation of the railways, so far as they affected military movements and coordinating the various roads with each other, in so far as the public necessity required. Furthermore, officials known as department general agents were placed at the headquarters of each military department, reporting both to the Railway War Board and to the department quartermasters. Agents, called camp general agents, responsible to the department general agents, were placed at each mobilization camp or military post. These were all officials of the American Railway Association and wore brassards with the initials A. R. A.

This committee, starting out with a comparatively small number was enlarged to 28 and finally to 33 members, including the executives of most of the important railroads of the country. Some time after its creation the name of this committee was changed to the Railway War Board, and its operations were carried on to the end of effecting one unified system of all the railroads of the country.

The Railway War Board was, with the exception of the salaries of the military members, maintained at the expense of the railroads. Its functions were:

- (a) To regulate the car supply.
- (b) To give preferences to the sources of supply and movements through congested areas.
- (c) To eliminate duplication of service by roads operating in the same territory.
- (d) To coordinate and produce cooperation between the railroads. In addition, it furnished material and personnel for the rehabilitation of the French railroads.

The camp general agents, under the direction of the military authorities, made all local arrangements for the transportation of troops and supplies to and from the camp, including the arranging of schedules, and the securing of the necessary cars.

Under the authority of the Railway War Board, instructions were prepared as to the handling of troops and supplies, which, with the approval of the War Department, were promulgated to all the interested carriers.

The headquarters of the Eastern Department being located at Governors Island, N. Y., the department general agent for the Eastern Department had his offices there. A representative of the department general agent was, however, located in the office of the general superintendent of the Army Transport Service. At this time the largest movements of troops were from one camp or cantonment to another, shipments overseas being still very small. Thus the railway movements for troops intended for overseas could be handled by the representative of the department general agent.

As the overseas movements gradually became more important, beginning about January, 1918, it proved advantageous to move the

office of the department general agent to the quarters of the general superintendent of Army Transport Service. The formation of the Embarkation Service on August 4, 1917, effected no material change in the actual mechanism for the handling of troops.

There was a subcommittee of the Railway War Board on military passenger traffic which supervised the routing of troops and effected their expeditious movement. The United States Government took over the control of the railroads in December, 1917, but this made no important alterations in the mechanism which has been described. The Railway War Board and the department general agents and camp general agents became agents of the troop movement section of the Railroad Administration. Among the duties performed by the Railway War Board were the arrangement for a uniform rate for military traffic over the various railroads of the country, and plans for the conversion of cars from one type to another as might be needed by the Military Establishment.

The transportation of freight was originally in the hands of the transportation officer of the supply bureau directly concerned. If the movement was small, the transportation officer made the arrangements directly with the carrier as any other individual would do. If, on the other hand, the amount of transportation required was sufficiently great as seriously to affect the traffic, the question of transportation was taken up by the transportation officer with the local or departmental general agent of the Railway War Board of the American Railway Association.

The scheme of transportation was not altered until in September, 1917, subsequent to the formation of the Embarkation Service, when transportation officers in the supply bureaus were required to obtain the permission of the commanding general of the port before shipping any freight to a port of embarkation. This consent was given in the form of the transportation release. After November, 1917, the granting of this transportation release was done by the Embarkation Service in Washington, in place of the commanding general of the ports direct. The Embarkation Service had, as already pointed out, no effective mechanism for holding up shipments at point of origin, such as, through the Railroad Administration, the Inland Traffic Service afterwards developed. In the absence of such effective mechanism the regulation was to a considerable extent disregarded by shipping officers of the supply bureaus.

Each of the supply bureaus had its own machinery for the handling of its transportation problems. Of these bureau transportation units perhaps the most complete was that of the Supply Division of the Ordnance Department. This ordnance transportation branch covered the entire field, with officers to contract for the transportation, officers to expedite shipment, and officers to handle the finances. An organized force of officers in the field was charged with the duty of handling all inland transportation matters.

In the Quartermaster Corps arrangements for shipment were made by depot quartermasters, many of whom, however, had officers detailed to the sole duty of taking care of transportation matters. These officers were utilized to make the arrangements as well as to follow and trace shipments. But the Quartermaster Corps did not develop a field force such as grew up in the Ordnance Department with the exclusive function of handling transportation matters.

In the other bureaus the arrangement was more similar to that of the Quartermaster Corps than to that of the Ordnance Department, and there did not exist such an extensive field force as the Ordnance Department possessed. On account of the fact, however, that the transportation problems of the other corps were smaller than those of the Quartermaster and Ordnance Departments their transportation branches were correspondingly of less importance.

Competition among the bureaus.—The conditions leading to the creation of the Inland Traffic Service furnish one of the most striking illustrations of the need which arose for coordinating the work of the several bureaus. The Army bureaus and other procuring agencies competed with each other not only for the products of industry, and for raw materials and for manufacturing facilities, but they were also in blind competition for transportation facilities. The responsibility which rested upon each bureau and upon each of the numerous divisions and subdivisions of the bureaus was to procure and to deliver in France the particular supplies, materials or munitions with which it individually was charged. The quartermaster officer buying shoes for the American Expeditionary Force felt no concern for any possible shortages in railway, warehouse, or steamship facilities from which some other division or some other bureau might be suffering. Nor did the Engineer Corps worry over getting forage or clothing or small arms from the farm or factory to the front. Neither was informed as to the transportation needs of the other units nor as to its own proper proportion of the whole. Each was responsible for its own task alone.

Naturally the inevitable result followed. In the placing of contracts the emphasis was all upon speed, and as the productive facilities of the country responded to the urgent demands of the hundreds of procurement officers, a vast stream of supplies began to flow over the railroads toward the ports of embarkation. Even as absolute quantities the shipments were soon in excess of the carrying capacity of the available ship tonnage, and congestion began at the ports. The universal pressure for speed resulted in shipments of Army articles greatly in excess of current needs. And with the submarine steadily making the available tonnage still more inadequate, such excess shipments meant either that the articles would be sent to France in cargo space more needed for other things, or that they would be held at the ports (as they were held in some instances until the end of the war), taking up much needed space and hindering the flow of the great current of supply.

It has already been pointed out that the Embarkation Service had imposed upon the shipping officers the requirement that goods should not be shipped for overseas unless on a release granted by the Embarkation Service. But the mechanism was lacking for putting this regulation into effect.

The result was a great congestion of freight at all important centers of traffic, great shortage of cars due to the fact that so large a number were standing to be unloaded, and at the very time when prompt unloading was so necessary, a great congestion of the unloading facilities. This condition instead of improving was rapidly becoming worse. Toward the latter part of December, 1917, the Government took over the railroads, in order to facilitate their oper-

ation as a single unit. But the Railroad Administration did no more, functionally considered, than step into the shoes of the carriers. In addition to all the steps yet taken, there was still need for an agency to direct, coordinate, and take care of Army transportation by rail.

The Division of Inland Transportation established.—Accordingly, arrangements were made by the newly appointed Director of Storage and Traffic for the securing of competent personnel and on January 10, 1918, there was appointed a Director of Inland Transportation and his functions were defined as follows:

1. He shall have jurisdiction over all matters pertaining to the routing and transportation, inland, of all troops and property by whatever means of transport. Bureau chiefs, commanding officers, depot quartermasters, and all other officers shall provide such assistance, information, and reports as may be required from time to time.

2. He shall prepare and promulgate for the information and guidance of those interested a system and uniform plan for conduct of the business of the division.

3. He shall be the chairman and exofficio member of the Priorities Committee of the War Department, established by the order of the Secretary of War, January 5, 1918.

The functions specified in paragraph 1 had previously been exercised severally by all the supply bureaus, and individually by local officers as the transportation was required. There had been no planning of the transportation problem as a whole.

The great task which immediately confronted the new Director of Inland Transportation was the remedying of the freight congestion which had become extremely serious. For handling this problem a method was devised which, though far-reaching in its application, was simple in principle and effective in the accomplishment of its purpose. The principle was that shipments to ports of overseas embarkation as well as to other congested points should not be accepted by the carriers at points of origin except with the approval of the Division of Inland Transportation. This approval was to be evidenced in certain cases by a transportation order which not only allowed the shipments to be made but operated as an order to the carrier to furnish the necessary transportation. It was provided that:

On and after March 1, 1919, shipments of Government property by freight in carloads, either for domestic use or shipment overseas, for account of the War Department, other than coal, or live animals, and live animals and property being moved with troops, must not be forwarded, unless authorized by a transportation order bearing the serial number and seal of the Division of Inland Transportation, War Department, to any depot, arsenal, storehouse, pier or other receiving station whether owned by the Government, the railroad, steamship company or privately, or to a Government officer or any other consignee at New York or other port of embarkation named in the order.

Supply bureaus, wishing to arrange shipments overseas, were required to obtain a release from the Embarkation Service and to present this release in applying to the Inland Transportation Division for a transportation order, without which the shipment could not move from the point of origin. The Director of Inland Transportation and certain others serving under him were officials of the Railroad Administration as well as of the War Department. It was therefore possible, through the Railroad Administration, to issue

orders mandatory upon the carriers for the application of the transportation order plan. All this was in line with the policy previously adopted by the Embarkation Service, but it was a considerable extension of it in the following respects:

1) The conditional embargo of the Embarkation Service applied only to shipments to ports of goods destined for overseas use, whereas that of the Division of Inland Transportation applied to all War Department traffic to all congested points, with such exceptions as they chose to make.

(2) The release granted by the Embarkation Service signified that the port facilities were able to take care of the shipment covered by the release. The accompanying transportation order of the Division of Inland Transportation was a guarantee that the property could and would be promptly unloaded on its arrival at the port.

Those transportation orders were ordinarily confined to shipments to the particular ports and points of congestion specified in the order; but in all cases where any Government agent or contractor was unable to get necessary transportation with sufficient promptness, a transportation order would be issued calling for immediate shipment by the carriers. Under these circumstances the Inland Transportation Division not only issued the order but took all necessary steps to see that it was complied with. There were other important features of the plan, such as the prevention of unduly large shipments by express, etc.

Plan of organization.—The work of the Division of Inland Transportation was divided under two natural heads namely, property movement and troop movement, and its organization corresponded to this division.

The Property Movements Branch was subdivided to correspond with the various supply bureaus of the Army. The function of the Property Movements Branch was to take all the necessary steps of any kind and character whatsoever in regard to rail movement of property for the Army, with the exception of the actual making of the transportation contract. It took care of the transportation orders for the movement of property, made arrangements concerning the imposing and lifting of embargoes, the furnishing of cars and equipment, the tracing and expediting of shipments, etc. To facilitate its operations a complete car record office was set up by the Railroad Administration immediately adjacent to the quarters of the Division of Inland Transportation. This office was operated by experienced car accountants and along lines which the railroads had developed by long experience. The office served not only the Army but the Shipping Board and the Navy. In other words, it was an office which kept records of the movements by rail of all Government property.

The function of the Troop Movement Branch was to serve as a connecting link in the matter of arrangements for the movement of troops between the Railroad Administration on the one hand and the various parts of the Army organization concerned on the other. Such movements were of course ordered in the first instance by the Division of Operations of the General Staff through The Adjutant General. To the extent that they related to embarkation overseas, they concerned the Embarkation Service and the commanding generals of the ports. The department quartermasters and the camp authorities involved were also interested parties.

In the matter of moving troops for embarkation overseas, it was customary for the Chief of Embarkation Service to formulate in advance a program of the organizations to be released during the succeeding month. These programs were laid before the Railroad Administration and general plans made for carrying them out. As the time approached for actual movements, routes and dates were arranged by the Railroad Administration, and when approved by the Army authorities instructions were issued to the various railroads concerned with the transportation of the troops. The Railroad Administration maintained a Troop Movement Section charged with the responsibility for this work. The Troop Movement Branch of the Inland Traffic Division was always in close contact with this section. An idea of the scope of its activities may be gathered from the fact that it assisted in making the arrangements for the movement of approximately 5,000,000 men.

The field force which had been developed in the Ordnance Department was instructed on January 15, 1918, to report to the Division of Inland Transportation. In that division it was made the nucleus for a field force which was to do for all War Department shipments what theretofore it had been officially doing for the Ordnance Department only.

The Division of Inland Transportation was by an order of April 22, 1918, renamed the Inland Traffic Service and its functions were considerably enlarged by an order issued June 8, 1918, by The Adjutant General. This order abolished the separate transportation units in the various bureaus and transferred their functions to the Inland Traffic Service, with the result that all Army transportation matters came to be more completely centralized in that office. In the same order a set of branch offices in important cities was provided for and also numerous district offices of many points throughout the country.

In addition to the evils described as flowing from the competition which in the early days of the war existed among the bureaus, the Inland Traffic Service found an important difficulty existing in certain provisions of War Department contracts. These contracts frequently included an obligation on the part of the War Department to accept and move the property from the manufacturer's plant immediately upon its completion. This obligation was an important influence in bringing about shipments which could not be handled at the point of destination and which therefore tended to create railroad congestion. These provisions were substantially nullified by the system of control at point of origin inaugurated by the Inland Traffic Service, although this action gave ground for later claims against the Government on the part of contractors who through this control were put to additional expense in storing goods which the Government had contracted to take over as soon as completed.

After the system was established of allotting to each supply bureau the amount of cargo space to which it was entitled, the Inland Traffic Service was kept informed of these allotments, and made arrangements for confining within these limits rail shipments for the respective bureaus. These arrangements supplemented in a very useful way the operation of the tonnage allotment system.

The movement of troops to ports, however, was but one part of the work of the Inland Traffic Service. In general the movement

of troops in the United States during the war may be divided into five phases:

(1) The movement of portions of the Regular Army within the United States from the Mexican border to various camps.

(2) The movement of the National Guard to its training camps.

(3) The movement of the selective service men from their homes to the cantonments.

(4) Intercamp movements to meet the needs of the service.

(5) The movement of organizations from the camps to ports of embarkation.

The first movement recorded began on May 18, 1917, when various regiments on the border began to entrain for interior points. On June 4, this movement, involving approximately 25,531 officers and men was completed. Included in this was the movement of the First Division to Hoboken for transportation to France. The movement of the National Guard troops to their camps involved the transportation of about 343,223 men, and extended over a period of 11 weeks, from August 4 to November 23, 1917. This movement was still in progress when the first detachments of the new National Army left their homes for the cantonments on September 5, 1917. The 4,581 entraining points and the nation-wide distribution of the stations to which the selected men were eventually sent, made this an extremely complicated problem. At times the railroads were called upon to handle as many as 50,000 men in one day, and to transport within a single month over 400,000 men for the selective service system alone. Of the total number of men drafted, 2,755,476 were transported to camp by roads controlled by the Railroad Administration. It is estimated that these movements represented about one-fourth of the entire troop movement of the Army. About August 1, 1917, large intercamp movements of the Regular Army commenced, in the course of which organizations were ordered from their stations to more convenient points, and recruits transported from various depots to these camps. Many troops were transported from northern to southern cantonments during the early part of the winter, and by January 1 approximately 308,000 men had been thus moved about the country. Toward the middle of October, drafted men began to be transferred from the National Army cantonments to the new National Guard divisions in order to bring them to full strength. Later in the year this process was extended to the new Regular Army divisions being formed, and throughout 1918 an elaborate process of distributing men from the depot brigades to units throughout the country was taking place. In these movements the general policy of the staff was always to move troops from the West toward the eastern coast, though this was not always possible. The intercamp movements involved about 42 per cent of the total number of men transported by rail between January 1 and November 11, 1918. Finally, every man shipped abroad had to be transported by rail to the port of embarkation before he could go aboard ship. Between the 1st of May, 1917, and the 11th of November, 1918, over 2,174,455 men were transported by the railroads to the ports. Of these 1,758,033, or 81 per cent of the total, were transported to Hoboken and the embarkation camps serving that port; 250,404 men, or about 12 per cent, went to Newport News, and the rest to other

ports. Of the total number carried to ports of embarkation during the 19 months of the war, 76 per cent (1,653,470 men) were embarked in the seven months from April to November, 1918.

The movement of a combat division from its camp to the seaboard was a complicated and difficult undertaking. The movement of the 18,819 men of the Eighth Division (which does not include its Artillery brigade) from Camp Fremont, Calif., to Camp Mills, Long Island, in October, 1918, one of the best performances in the field of inland transportation during the war, illustrates the nature of the task. The first train left camp at 9 a. m. October 18; the others at hour and a half intervals from 9 a. m. to 4.30 p. m. at the rate of six trains per day. The last train left at 4.30 p. m. October 24. These 42 trains, averaging 448 men with nearly 14 cars to the train, traversed 3,444 miles to their destination at an average rate of about 20 miles per hour, in an average time of 7 days and 3 hours. The efficient cooperation of all concerned made possible the dispatch of all trains on the minute scheduled, with the exception of two, which were, respectively, four and five minutes late. As the result of a competition in loading inaugurated among the train commanders, few trains after the second day required more than five minutes from the time of arrival of the troops in the area to the last man entrained. Fifteen trains were loaded in less than three and one-half minutes each. This movement took place in the last weeks of the war, under the efficient organization which had been developed by that time. Forty-two such divisions, the majority of much larger strength, were so moved during the war, albeit under much greater difficulties.

From May, 1917, to November 11, 1918, the railroads of the country transported 8,714,582 men, an average of 502,764 per month. The maximum was reached in July, 1918, when 1,147,013 men were moved. Of the total number of men moved during the war about 26 per cent were drafted men on their way to camp, 25 per cent were troops moved toward the ports, and the remaining 49 per cent represent the mobilization of the Regular Army and the National Guard, and the intercamp movements. In this task it was not found necessary, as in Europe, to utilize freight cars for the transportation of troops, and in the majority of cases sleeping cars were furnished for journeys of over 24 hours duration. About 31 per cent of all troops moved were supplied Pullman cars.

Detailed arrangements for handling over 8,500,000 troops have been made by the Passenger Traffic Branch since July 1, 1918. This has involved handling 11,722 special trains averaging per train, 10.7 cars, 31 hours, 632 miles, 22 miles per hour, and 434 passengers.

It will also be noted that 1,494,533 troops have, by June 30, 1919, been returned from overseas since December, 1918. These troops, after arrival at the port of embarkation, were segregated into detachments and sent to the camps nearest their homes. This system made a much more complicated proposition than the movements for embarkation overseas. In the latter case, troops were moved as complete organizations to one destination; but, on the return trip, an organization may have been divided into 10 or 15 detachments for as many destinations. These movements were further complicated by the fact that it was the policy of the War Department to grant, as

far as possible, the many requests for the parading and entertainment of troops at various points en route to their destination. The details of such arrangements all passed through the Inland Traffic Service, and something over 400 parades and stops for entertainment were authorized. In some cases as many as three or four stops were made by one organization, in many instances consisting of several trains and from two different ports, necessitating the consolidation of trains at the various points in order to form one parade.

Achievements of the Inland Traffic Service.—The traffic congestion which confronted the Inland Traffic Service at the very outset is a typical illustration of the conditions which were bound to result, in a war of such great proportions, from the bureau system of organization. The achievements of the Inland Traffic Service similarly afford a very convincing proof of the benefits which flow from efficient unified control. The problem which confronted the Inland Traffic Service was essentially a railroad problem. The personnel of the service was very largely recruited from experienced railroad men. A study of the problem which the service had to solve and of the efficient way in which the solution was achieved leads almost inevitably to the conclusion that if the independent activities of the bureaus in shipping war supplies had been subjected in the summer or fall of 1917 to the kind of control later established, the traffic congestion of the following winter might have been avoided in a very large degree and might possibly have been prevented altogether. In spite of the very serious conditions existing when the Inland Traffic Service began its work, the freight congestion was removed within a few weeks after its system of control was put into effect and from that time on movement by rail of Government supplies was always well under control.

THE STORAGE BRANCH.

The final service involved in the administration of the immediate problem of supply and forming a fourth arm of the Purchase, Storage and Traffic Service was that of storage, which dealt with all matters centering about the custody of supplies held for use in this country, in reserve or for shipment overseas.

In giving the account of storage control during the war it is necessary to bear in mind the fact that the development proceeded from absolute decentralization among the various bureaus toward complete centralization of control under Purchase, Storage and Traffic. This development was not fully consummated while the war lasted. There was an intermediate period during which supervision of the storage activities of the bureaus was exercised. Toward the end of the war complete centralization of control was begun, but it was interrupted almost at once by the signing of the armistice.

It must be borne in mind that storage was preponderately a quartermaster problem and that storage control by the Purchase, Storage and Traffic Division grew largely out of the Quartermaster Corps. The subject was very closely related to the supply bureaus, and a clear picture of the storage situation in the Army when the United States entered the war is essential.

The storage systems of the bureaus.—Under the scheme of organization existing in the office of the Chief of Ordnance at the outbreak

of the war there was no central agency for the handling of storage. However, a supply division was soon created and assumed the functions of storage and custody. By the early part of 1918 Ordnance general supply depots had been classified into four main types, according to the nature of the work they had to do and the place they held in the scheme of distribution. These were: (1) Assembly depots, (2) reserve depots, (3) district depots, and (4) embarkation depots. In addition to these four types there were other spaces in ports, in warehouses, or on piers available for the storage of ordnance material. The principal storage problems of the Ordnance Department had to do with the creation of special facilities for the storing of explosives.

Before the Signal Corps was split up into three distinct organizations it had jurisdiction of all planes and parts, as well as all materials and equipment for the use of the Signal Corps proper. With the reorganization there went a division of the existing depots and storage facilities among the Department of Military Aeronautics, the Bureau of Aircraft Production, and the Signal Corps. The Bureau of Aircraft Production received only three whole or partly completed projects out of the 21 original depots belonging to the old Signal Corps. As regards organization, storage matters in the Signal Corps were handled by the Distribution Department of its Supply Accounts Division. The Distribution Department exercised operating control over the several Signal Corps general supply depots and all Signal Corps activities at ports of embarkation. Storage matters in the Bureau of Aircraft Production were handled by its Purchase, Storage and Traffic Division.

The storage problems of the Engineer Corps were dealt with at Washington by the General Engineer Depot, which was a part of the organization of the Office of the Chief of Engineers. This depot had charge of the purchase of all engineering supplies in addition to storage. The latter function was exercised by the Depot Department, which was burdened, besides the administration of the various engineer depots throughout the country, with various questions relating to facilities, personnel, and uniform systems of operation. Three large departmental depots were maintained as well as a number of subdepots at various cantonments for the issue of matériel. The space needed for this was small and not specialized. Stores destined for shipment overseas were handled directly from the producer to the port of embarkation. There were two engineer embarkation depots with small depot forces maintained at a half dozen other points on the seaboard. The main items of storage were structural steel, wire and wire netting, locomotives, freight cars, and railway material. These presented problems of open storage mainly.

In amount of floor space required for storage the Medical Corps ranked third among the supply bureaus. The principal items were beds, chairs, and hospital equipment. The requirements for storage space for the reception of these supplies increased so rapidly after the outbreak of war that new buildings had to be added from time to time. Overseas embarkation warehouses were in operation at the two principal ports of embarkation and subsidiary supply depots were established at all camps and cantonments.

When the war began there were 13 general supply depots operated by the Quartermaster Corps, which contained about 70 or 80 per

cent of the storage floor space occupied by all of the supply bureaus together. A fourteenth was added later. These depots were administered under an extremely decentralized system. All supervision over the supply of posts, camps, etc., was in the hands of the six territorial departments of the Army, conducted by the department commanders and under them, by the department quartermasters. It was not until some time later that a definite supervision was given to the Quartermaster Corps through its general supply depots over the distribution of Army supplies to camps in this country.

The functions of the general supply depots were to distribute supplies to subdepots at camps, maintain reserves, and in some cases act as embarkation warehouses. The principal problems with which the central organization at Washington had to deal concerned matters of operation and personnel rather than the actual securing of space. Almost any kind of interior space could be utilized, and no lifting machinery had to be installed for the lifting of stores. There was much more shifting of supplies in the case of quartermaster depots than in any other type of Army warehouses. Since the quantity of stores was so rigidly governed by the given number of troops to be supplied in a given district, troop movements and overseas requirements necessitated constant changes in size of stores. Food, forage, clothing, vehicles, and harness were the principal items to be considered.

The question of specialized space for cold-storage purposes was a serious one. The Government had to lease all of its cold-storage space, as it owned none. It was very difficult to secure enough cold-storage space of the right kind at a given place. It was found impracticable to use a given warehouse for both cold storage and other types of storage.

As has already been remarked, the Quartermaster Corps did not exercise as complete control over its depots as did some of the other bureaus, nor did it have the same detailed information regarding them. Each depot, while a distributing agency for a given zone, was responsible also for production within its territory, and in this bore more nearly the relation of a branch house to the central controlling agency in Washington than did the warehouse system of any other supply bureau.

The Motor Transport Branch of the Quartermaster Corps (later the Motor Transport Corps) presented a rather unique storage situation. This branch was charged with the production of and carriage to the seaboard of all quartermaster trucks. For this purpose three convoy districts were created, each district including all the manufacturing plants producing trucks within its boundaries. The trucks were moved under their own power, and whenever possible carried cargo to the seaboard. No problem of storage existed at the point of origin. The only type of storage needed at the embarkation point was open parking space for which firm ground had to be provided.

The foregoing indicates the diversity of problems, facilities, and organization of the storage function within the bureaus at the beginning of war and the length to which coordinating authority had to go before effecting any degree of unity out of the decentralized state into which this highly important supply function had fallen under the bureau system of administration.

Development of General Staff supervision of storage.—In view of the fact that, as has already been stated, the Quartermaster Corps was burdened with approximately 80 per cent of the problem it was natural that the process of central supervision of storage should be developed out of the Quartermaster Corps. General Staff coordination of storage was accomplished by attaching to the Quartermaster system the storage methods and functions of the other bureaus.

Yet the difficult nature of the task is emphasized by the fact that the system of the Quartermaster Corps was the most decentralized of all and centralization within that department alone was a slow process. As has already been pointed out, there was at the beginning no central supervision of storage in the Quartermaster Corps. It was provided by regulation that depot quartermasters should report to the Quartermaster General, but there was no provision for any directing organization within the office.

It was not until several months after the declaration of war that storage was placed under the control of a separate division of the Office of the Quartermaster General. On October 16, 1917, a Warehousing Division was created but with authority only to gather data as to storage facilities. A month later, however, it was vested with real powers to act as a supervisor and administrator of all storage and warehousing operations in cooperation with depot quartermasters and to standardize and supervise operations and maintain statistical records. There was at this time no available record in Washington of contracts for supplies which had been placed by the Quartermaster Department and it was consequently impossible to estimate even approximately the storage requirements. Procurement, and substantially all the records pertaining thereto, were in the hands of the depot quartermaster scattered throughout the country. There was no uniform method of accounting; no regular system of stock keeping; in fact, no established method of operation common to the various quartermaster depots. The depot quartermasters established their own requirements for storage space, made direct application to the Construction Division (then known as the Cantonment Division) for authority to lease or build, and secured from the Construction Division the necessary allotment of funds.

The Office of the Quartermaster General at this time was not impressed with the necessity of providing additional storage facilities and no plan had been adopted for the construction of such facilities. At Chicago an arrangement had been entered into for the construction of temporary warehouses on leased land. An appropriation had been secured for the construction at St. Louis of the initial unit of a permanent warehouse. At Baltimore a site had been selected and plans were being prepared for a temporary quartermaster warehouse. These projects were practically the only ones of importance under consideration, with the exception of the storage facilities provided in connection with the construction of the National Guard camps and the National Army cantonments.

For the handling of overseas shipments existing commercial facilities were used exclusively. The Depot Board, appointed by the Secretary of War, in conjunction with a subcommittee of the Storage Committee of the Council of National Defense, had selected the locations for two overseas depots, one at Port Newark, N. J., the other

at Bush Bluff, Norfolk, Va. In addition to these projects, the commanding general of the port of embarkation, Newport News, had obtained authority directly from the Secretary of War to construct certain warehouses at Newport News for the handling of supplies destined overseas. These warehouses were located some distance from the existing piers and were never satisfactory from an operating point of view. No funds were available for the construction of storage projects and authority to create a deficiency had to be obtained in order to provide the necessary facilities.

The control of quartermaster supplies at depots, camps, and cantonments was entirely inadequate, and information upon which to base proper distribution of supplies was entirely lacking. The activities of the quartermaster depots had expanded at such a rapid rate that the prewar organizations had already broken down, with the result that a chaotic condition existed. The greater part of the month of December was consumed in efforts to obtain reliable data upon which to base a storage and distribution plan, and the beginning of the year 1918 found but little improvement in the general situation.

The ensuing two months was a period of considerable confusion in the Quartermaster Corps owing to a series of reorganizations which were effected in rapid succession in an attempt to construct machinery which could cope efficiently with the new conditions. When the Storage and Traffic Service was established on December 28, 1917, the Acting Quartermaster General was appointed Director of Storage and Traffic. This double appointment resulted naturally in a very close connection between the two offices but at the same time added to the general administrative confusion which prevailed in the transition process, and it was frequently difficult to determine the precise line between the two.

The Storage and Traffic Service was organized "to enable the Chief of Staff to exercise effectively his supervisory and coordinating powers in respect to the movement and storage of supplies * * *," and when the General Staff was reorganized, on January 9, 1918, into five main divisions, the Storage and Traffic Service continued "to have cognizance and control of the distribution of all branches of the Army and of all munitions and other supplies of the Army, both by land and sea, and the storage facilities in connection therewith * * *."

The supervision of storage thus became one of the two primary functions of the Director of Storage and Traffic and his combined directorship over this office and the Quartermaster Corps was another cause why the development of General Staff storage supervision proceeded naturally out of the Quartermaster Department. On January 11, 1918, after several preliminary readjustments, there was appointed in the office of the Quartermaster General a Director of Storage in charge of the Storage Division of that office. On February 10, 1918, the Director of Storage of the Quartermaster Corps became Chief of the Storage Division of the Storage and Traffic Service, being relieved of his Quartermaster function by an officer who took charge of the Warehousing Division into which the Quartermaster Storage Division had in the meantime again been changed. While the storage organization of the Storage and Traffic Service

was not given formal shape until February 9, 1918, storage supervision under that service was actually exercised for some weeks earlier under the single officer of the two organizations.

The organization of the storage supervision function was originally outlined on January 26, 1918, but this scheme was never put into effect, and was followed on February 9, 1918, by Storage and Traffic office order No. 1 (supplementary) which provided a substantially different type of framework. This took the form of a Storage Control Subdivision of the Storage and Traffic Service and included operating sections and subsections to handle or supervise and coordinate all of the matters and work related to storage and warehousing of property, whether for purposes of collection and concentration from places of purchase and manufacture, depot storage for distribution, or assembly at points of embarkation. Its internal organization consisted of a Depot Branch, divided into Production Depot, Reserve Depot, and Camp and Cantonment Depot Sections; a Central Office Service Branch; and a Planning Branch, including an Engineering Section to determine building and space requirements, locate warehouses and depots and make layouts; and a Warehousing Methods Section, to determine methods of receiving, storing, assembling, packing, etc.

The Director of Storage, upon assuming office, took over the task of supervising Army storage in general. In the carrying out of this task he was in frequent consultation with the Director of Storage and Traffic. Between February 10 and September 6, 1918, his functions were purely supervisory, his chief duty being the development of a comprehensive storage program and general supervision of the construction involved.

The General Staff had, in January, 1918, established a basis for reserve supplies to be held for the use of the oversea forces and troops in training in the United States. The reserve for the oversea forces was to be an eight months' supply, of which three months was to be carried in France, one month at the Atlantic seaboard, one month at points immediately tributary to the seaboard, and two months at interior depots. The points at which reserves in the United States were to be carried were determined by the Director of Purchase, Storage and Traffic and approved by the General Staff. For troops in training in the United States provision was to be made for a six months' reserve stock of supplies, of which one month's supply was to be held at camps and cantonments, the balance at interior depots. Upon recommendation of the Director of Storage this provision was later changed to provide for 60 days' supply at camps in order to effect more economical distribution through the shipment of carload lots to camps and cantonments rather than smaller shipments which were necessary when only a 30 days' supply was carried at these points. A further modification of the program for reserves was made later by Supply Circular No. 69, July 25, 1918.

Storage facilities.—On the basis of the above reserves and the geographical distribution indicated, plans were developed for the construction of the necessary storage facilities. Estimates were prepared covering the cost of the construction work to be undertaken during the fiscal year 1918, and in the urgent deficiency act of March

28, 1918, and appropriation was secured for inland and port storage and shipping facilities, amounting to \$100,000,000, with an authorization for an additional \$50,000,000. Of the \$100,000,000 appropriation, approximately \$67,000,000 was required to make good a deficiency existing as of March 28. Of this deficiency \$26,000,000 had been incurred for construction under the program developed by the Director of Purchase, Storage and Traffic. The balance had been previously obligated by the Construction Division of the Army to cover the cost of projects originated by the several bureaus.

As a result of instructions issued to all bureau chiefs by the Director of Purchase, Storage and Traffic, requirements for storage and shipping facilities were to be submitted to the Director of Storage for investigation and approval prior to action being taken. Several of the bureaus at this time had on hand funds for the construction of storage facilities, available from previous appropriations. The Director of Storage was charged with the responsibility of determining the actual storage requirements for all bureaus and of determining the locations for additional facilities from the standpoints of production and economical distribution. Whenever one of the Army bureaus desired additional storage facilities a statement of its requirements, together with the requisite data showing the necessity and the desirability of locations, etc., was submitted to the Director of Storage, whose office investigated the need of the project, approved of the location and authorized the allotment of funds.

In considering the need of such storage the Director of Storage ascertained if the production program of the bureau desiring additional space had been approved by the Director of Purchases and Supplies. With this as a basis, and with knowledge gained from the Chief of Embarkation and the Director of Inland Traffic as to transportation facilities the Director of Storage was in a position to determine the amount of storage space actually necessary. Having approved of the project and allotted the funds, construction began under the supervision of the Construction Division of the Army. On completion of the project it was taken over and operated by the bureau concerned. Supervision over the process of construction was maintained through the Engineering Section of the Office of Director of Storage. This supervision did not amount to actual control of the project, however. It was found when supervision began that storage requirements of the bureaus were sometimes exaggerated, locations were poorly chosen, prices paid for real estate rentals were too high, and in some cases storage facilities and personnel were provided which were never used. It was the task of the Director of Storage to do away with such conditions.

It was apparent from the start that the storage requirements as submitted were theoretical rather than actual, and that the basis for the calculation of requirements was invariably unsound. The steadily increasing demand for supplies incident to the rapid increase in the size of the Army demonstrated the fact that the reserves called for by the General Staff program could not be accumulated for several years. Consequently no attempt was made to construct storage facilities conforming to the theoretical requirements of the Army program, and expenditures were authorized to provide only such facilities as would be necessary for the proper storage and

handling of the supplies which would be available in the immediate future. At no time did the storage facilities under control of the Army represent more than 50 per cent of the theoretical requirements. In this connection it is interesting to note an estimate of storage requirements prepared in August, 1918, upon the basis of requirements submitted by the several bureaus. The total estimate at this time was 153,301,480 square feet. The total amount of storage actually made available was 63,171,131 square feet. The accuracy of this statement, it must be understood, is only approximate. It does, however, show the relation of theoretical requirements to available storage space.

As has already been stated, the Army supply base at Port Newark, later operated by this branch, had been located, designed, and constructed prior to the establishment of the Office of the Director of Storage. This had been done by the Construction Division with the assistance of the Depot Board and the Storage Committee of the Council of National Defense. The storage facilities at Norfolk were also started prior to the creation of the Storage Branch. Work on the Port Newark base was well under way, but at Norfolk construction had been delayed owing to the fact that the facilities as planned were found to be undesirable from an operating point of view. Plans for both the warehouses and piers were revised and work resumed under the authority of the Director of Purchase, Storage and Traffic.

During the period from January 1 to July 1, 1918, construction work was begun on practically all the important storage projects undertaken by the Purchase, Storage and Traffic Division. Among the more important projects at interior points were:

- Permanent warehouses at Chicago.

- Completion of a permanent warehouse at St. Louis.

- Army reserve depots at Columbus, Ohio; South Schenectady, N. Y.; and New Cumberland, Pa.

- Additional warehouses at Jeffersonville, Ind.

- Additional warehouses on Governors Island.

- Philadelphia interior depot.

- Additional facilities at Pittsburgh.

- An increase in warehouse capacity at all camps and cantonments, amounting to practically 100 per cent.

- Cold-storage facilities at camps and cantonments.

- Engineer subdepots at camps and cantonments.

- Powder magazines at a large number of camps and cantonments.

In addition to the increased facilities through construction a large number of buildings were leased to afford necessary storage space in connection with existing depots.

At the seaboard the following projects were originated by the Director of Purchase, Storage and Traffic during this period:

- Army supply base, Boston, Mass.

- Army supply base, South Brooklyn, N. Y.

- Army supply base, Philadelphia, Pa.

- Army supply base, Charleston, S. C.

- Army supply base, New Orleans, La.

On account of the unusual engineering problems involved in the construction of these storage and shipping projects at the seaboard,

the Director of Purchase, Storage and Traffic was authorized to employ a staff of engineers to represent his office in supervisory capacity in connection with this construction work. While these engineers supervised the construction of the port projects, they were without authority so far as actual control over building operations was concerned.

The three Army reserve depots the construction of which was undertaken were for the joint use of the several bureaus. They were authorized in pursuance of the General Staff plan for the accumulation of reserves. The New Cumberland and South Schenectady sites were to be regarded as adjacent to seaboard and the Columbus site as inland. The New Cumberland and South Schenectady sites were selected because of the facility with which supplies could be sent from these points to ports of embarkation. None of the three was to be an issuing depot, although supplies stored in any of the three might be sent to other depots for issuance in the United States. The foregoing explains why these three depots were called Army reserve depots, although they were not designed to accommodate all reserves in the United States provided for in the General Staff program, as seaboard reserves were, of course, to be kept in various warehouses actually at the seaboard.

It was regarded by the Council of National Defense and others that the storage facilities included in the program of the Director of Storage as the three Army reserve depots would prove inadequate in the carrying out of the Army reserve program. The Director of Storage, however, took the position with the support of his superior that the limiting factor would be the production of supplies, and that the facilities planned would be adequate to store any reserves actually accumulated. With hostilities ceasing as they did in November, the decision not to furnish more ample facilities proved fortunate. If storage facilities had been provided on the full schedule called for by the reserve program, they would never have been fully utilized and a large number of expenditures would have been incurred in their construction.

These joint storehouses were operated under the supervision of the Director of Storage. Each warehouse was under the direction of an officer reporting to the Director of Storage. The operating system, however, amounted simply to the allotting to the various bureaus of the War Department of space in these depots. Each bureau maintained its own representative at the warehouse to keep the records of that bureau. The labor supply was pooled for the use of all bureaus. The Storage Division also provided all freight handling equipment and personnel at the Army reserve depots as well as at all port storage warehouses. The operating functions were carried on under the supervision of the Operating Section.

Prior to the establishment of control over storage facilities, a most chaotic condition had existed. Each of the bureaus had originated its own projects without regard to existing facilities or the possible creation of facilities for the joint use of several bureaus in the same locality. With the exception of the Ordnance Department, none of the bureaus had developed a uniform system of accounting for use in the depots, and it was an impossibility to determine accurately from any records in Washington the availability of supplies. To

this fact was largely due the unbalanced procurement program of many of the bureaus during the early months of 1918. The Ordnance Department had developed a system of accounting and reports which necessitated the employment of a personnel far in excess of any reasonable requirements, and on the basis of theoretical production had developed a storage program which would have entailed the expenditure of many millions of dollars which were saved to the Government through the establishment of central control. It is of interest to note that had the Ordnance Department carried out its program, the storage facilities constructed would never have been wholly utilized until some months after the signing of the armistice and the termination of shipments overseas. At this time buildings costing the Government many millions of dollars were being erected upon leased land, the leases containing no provision as to purchase, and land was being acquired for storage purposes, both by purchase and by lease, at prices in excess of actual value.

It can be seen from the foregoing that statistical control was an important phase of the storage problem, and arrangements were made whereby the Director of Storage received reports at certain intervals from each of the bureaus, giving the space occupied and unoccupied in their various warehouses, description of the purpose of the warehouse, and stating whether it was leased or owned by the Government. Whenever necessary the bureaus presented their estimated future needs for space over a considerable period of time.

Reference had already been made to the fact that approval was given for the creation of terminal storage facilities at Boston, South Brooklyn, Philadelphia, Charleston, and New Orleans. Plans for facilities at Baltimore were inaugurated but later abandoned. It was the idea of the Director of Purchase, Storage and Traffic that these facilities should be so located and constructed as to be available for commercial use in time of peace. These various projects were only partially completed at the time of the signing of the armistice. The Port Newark Terminal, however, was in actual operation for six months or more prior to the cessation of hostilities, and the Bush Terminal facilities in South Brooklyn, including storage warehouses, were leased and operated by the Government. The storage facilities at St. Louis were planned as a supply base for the Southwest, with possible operations on the Mexican border in view. The facilities at Chicago were intended to be for joint Army use, but were actually used for quartermaster purposes only. For the storage of explosives additional facilities were provided at Raritan, N. J.; Curtis Bay, Md.; and Pig Point, Va.; and authorized at Oldman, N. J. An explosives depot was also under construction at Charleston, adjacent to the Army supply base.

From the date of the creation of the Office of Director of Storage it was perceived that the most important function of the office was control of distribution, storage being merely an incident thereto. The saving in rail transportation through orderly distribution had apparently never received serious consideration prior to January, 1918, and the handling of supplies at the seaboard was in a state of almost hopeless confusion. Through lack of proper storage facilities at the ports, piers were universally used for storage, with the result that supplies were loaded on board ships not in accordance with the actual requirements of the American Expeditionary Forces,

but purely as a result of their accessibility. All of the ports used for overseas shipments were congested, and the records of supplies sent overseas were painfully inadequate and inaccurate. During the early days of overseas operations, the Engineer Corps was called upon to ship a tremendous tonnage of construction material, and to handle these shipments established depots at Kearney, N. J., and Norfolk, Va.

During the early months of 1918 it became apparent that the unsatisfactory condition existing at expeditionary ports was partially due to lack of proper coordination of the activities of the several bureau representatives at each port. The limited storage facilities available were not being utilized to capacity owing to the established practice of allotting certain definite warehouses to each of the bureaus, with the result that space controlled by one bureau was often unoccupied while other bureaus had a surplus of supplies which had either to be left in the cars in railroad yards or stored on the piers.

On March 8, 1918, the Director of Storage and Traffic submitted recommendations relative to a change in the method of the operation of storage facilities at the port of New York. On April 6, 1918, these recommendations were approved in principle and authority was granted the Director of Storage and Traffic to put them into effect with certain modifications. This action brought about the appointment of a storage officer for the port of embarkation, under the commanding general, to have general supervision over all storage space and over the different bureau representatives at the port, to coordinate their activities, and with authority to allot storage space at the Bush Terminal and Port Newark Terminal from time to time as needed. The bureau representatives were to retain the responsibility for supplies or storage and for their assembly for overseas shipments. This arrangement enabled the organization of the Bush Terminal to be preserved, but gave a foundation for a future system to be developed under the Director of Storage and Traffic along the lines dictated by experience.

The next development in the operations at expeditionary ports took place as the result of General Order No. 54, War Department, June 3, 1918, which established definitely the status of the port storage officer and the bureau representatives, who were thereafter known as port supply officers. General Order No. 54, as subsequently amended by Supply Circular No. 94, September 27, 1918, placed upon the port storage officer responsibility for the authority over storage and distribution of supplies of all departments, bureaus, corps, and other agencies of the War Department and the operation of all storage facilities.

It is to be noted that the tendency in the control of supplies at the ports had proceeded steadily in the direction of unified control and responsibility. The results following the consolidation of all storage and distribution activities at the port were a complete justification of the policy recommended by the Director of Storage and Traffic in March, 1918.

After the development of the construction program to provide necessary facilities, the problem of distribution and uniform methods of stock keeping and accounting occupied the major portion of the time of the Director of Storage.

Beginning of consolidation of storage.—The combination of the offices of Director of Storage and Traffic and Acting Quartermaster General which had been effected in December, 1917, and continued in April, 1918, when the former became Director of Purchase, Storage, and Traffic, lasted until May 9, 1918, when, by General Orders, No. 46, a new Acting Quartermaster General was appointed. For several months subsequent to this date there was in all formality an absolute separation between the two organizations, and the office of the Quartermaster General bore the same relation to the Purchase, Storage and Traffic Division as did any other bureau of the Army.

On August 27, 1918, however, the Office of the Quartermaster General was definitely subordinated to that of the Director of Purchase, Storage and Traffic (this important development is discussed more fully at a later place). Supply Circular No. 80 of that date set forth the organization of the division and provided that the Quartermaster General of the Army should report to the Director of Purchase, Storage and Traffic. This order also stated that "the Quartermaster Department, in addition to its other duties, shall have responsibility for and authority over storage, distribution, and issue within the United States of all supplies from the Army." The particular effect of the latter provision was to place the Director of Storage under the supervision of the Acting Quartermaster General, and this was officially accomplished on September 6, 1918, by Supply Circular No. 85. On September 12, 1918, by Supply Circular No. 91, this arrangement was slightly changed by the provision that the Acting Quartermaster General as Director of Purchase and Storage should have responsibility for and authority over storage, distribution, and issue of all supplies, and that, reporting to the Director of Purchase and Storage should be a Director of Purchase and a Director of Storage.

The significance of the foregoing changes is plain. They were made with a view to transforming the existing supervisory control of storage into actual executive control, and the binding of component parts into a complete system. Consolidation of the important supply functions of the various bureaus of the Army was soon to begin. The necessity for such consolidation had been discussed in the memorandum of July 18, 1918. In regard to storage it had been said:

This is a highly specialized task and should be dealt with by storage experts. Storage is rendered necessary by fluctuation in procurement and transportation. Procurement and transportation are integral problems, to be dealt with by separate integral systems. Therefore, the storage system of any army should be one system, carefully designed with reference to the systems of procurement and transportation, physical as well as organizational.

Articles fall into classification for storage according to their nature, as breakable, inflammable, explosive, perishable, etc., and not into artificial classifications according to the use to which they are to be put after they come out of storage. The regulation of distribution with full reference to centers of production and to facilities for transportation and storage is necessary in order to obtain bulk shipments, to void duplicated small shipments, and to accelerate supply. Such regulation of distribution can be obtained only by consolidation of storage.

It is axiomatic that distribution, i. e., the breaking of bulk, should be as near as possible to the point of use and as far as possible from the source of production. The maintenance of numerous storage systems breaks bulk at the very source of production and therefore violates the axiom.

Property and stores accounting ought to be uniform throughout the Army.

Conclusion: Storage ought to be consolidated in one central system responsible for the storage of all supplies. Such is the case in all great business systems and in the English and possibly other armies.

The first step in the realization of this conclusion was the consolidation of the office of the Quartermaster General with that of the Director of Purchase and Storage, which brought under the central supervisory authority 80 per cent of the procurement and storage operations of the Army.

To take care of these increased activities, a plan of organization for the office of the Director of Storage, after one unsuccessful attempt, was worked out, stated in Purchase and Storage Notice No. 19, dated October 28 and made effective November 1, 1918. The office was to consist of the following divisions: Storage Administration Division, Domestic Distribution Division, Domestic Operations Division, Overseas Distribution Division, Port Operations Division, Salvage Division. This was the form of organization as found at the conclusion of the war.

Between the time when Quartermaster storage was taken over and the signing of the armistice the storage functions of three other bureaus were transferred to the General Staff supervisory authority. By Supply Circular No. 99, October 22, 1918, the entire Depot Department of the General Engineer Depot was transferred to the Office of the Director of Purchase and Storage, as well as so much of the Office of the Director General of Military Railways as was engaged in the work of storage and distribution of railway equipment and material. By Supply Circular No. 102, October 24, 1918, the entire Supply Branch and Supply Depots Branch of the Finance and Supply Division of the Office of the Surgeon General was transferred to the Office of the Director of Purchase and Storage. By Supply Circular No. 103, October 23, 1918, the entire Supply Division of the Signal Corps was also transferred. The effect of these three acts, while they made certain reservations in regard to the procurement function, was to place the storage function under the control of the Director of Purchase and Storage to be operated directly by the Director of Storage.

This was as far as consolidation had gone when the armistice was signed. The developments since that time will be taken up in their proper place later. It is sufficient to say here that consolidation was continued to some extent but not to cover the entire field.

In the taking over of the storage, distribution, and issue functions of the several bureaus referred to above, the various organizations were simply grafted onto the existing Quartermaster organization, which was from time to time subjected to minor changes to meet the new requirements. The amalgamation was of necessity a slow process, as nothing could be done which might interrupt the flow of supplies to the troops in the field. At the time of the general reorganization of September 6, it was the plan to consolidate under the Director of Purchase and Storage the procurement of all nontechnical Army supplies. This was not fully carried out. Thus it was decided, as will be seen later, to leave in the Ordnance Department the storage of artillery and parts and ammunition and components.

The history of storage brings out in clear relief the same undesirable effects of the bureau system of supply from the standpoint of the storage problems involved as have been observed in connection with other parts of the supply task, and brings out also in strong contrast the achievements of the Purchase, Storage and Traffic Di-

vision in the handling of those problems as a supervising and coordinating agency.

THE FINANCE DEPARTMENT.

Finance is not so much a special field reserved for the service of the supply system as it is an agency auxiliary to all activities of the Army. Nevertheless it affects supply very closely, and it was natural, therefore, that centralization of the supply organization could not proceed very far without involving the field of finance, and that the centralized control of financial activities should be undertaken by and in connection with the coordinating agency.

It has already been seen that early attempts at standardization of the financial transactions of the bureaus were conducted under the auspices of the Finance Section which had been set up as part of the machinery of the Purchase and Supply Branch. The authority of this section, had, however, been supervisory only in the most general way.

The beginnings of the present Finance Department date from the issuance of Supply Circular No. 80, of August 27, 1918, which reorganized the Purchase, Storage and Traffic Division. It abolished the Finance Section and set up in its place an Accounts Department coordinate with the other main departments of the division. The duties of the new department were stated to include responsibility for and authority over disbursements, fiscal accounting, preparation of estimates, and reports of accounts.

In the establishment of the Accounts Department it was intended to create an operating organization which would eventually take over the activities of the finance sections of the supply bureaus. This was clearly indicated in the memorandum of July 18, 1918, which had served as the basis for the reorganization. It had been pointed out in that memorandum that the powers of the Accounts Department up to that time had been in the main supervisory only; that supervision over several agencies tended to envelop and duplicate executive control, to create conflicts of authority, and to divide responsibility, especially where the supervisory organization had administrative powers; and that supervision was naturally much weaker than central responsibility and executive control. So far as finances was concerned, it was urged that:

Fiscal accounting is a special, self-contained function. Unless bookkeeping methods are uniform there can be no system in accounts. The War Department is gradually moving toward a budgetary system and should accelerate the movement. There is no sound reason for independent accounting systems and there is every reason against them. Ideal organization would comprise one compact, unified division, responsible for supply, with subdivisions for purchase, storage, transportation, finance, and facilities.

The duties of the finance subdivision were outlined as follows:

1. Supervision and control of fiscal accounting methods and organization for entire War Department.
2. Preparation in budget form of estimates for entire War Department.
3. Reports at stated intervals of accounts for entire War Department.

General Orders, No. 80, War Department, August 26, 1918, which effected reorganization of the General Staff, charged the Purchase, Storage and Traffic Division among other things with "the supervision and coordination of all fiscal accounting systems and appro-

priations, estimation, and requirements and other financial matters relating to the purchase of the munition and all other supplies," which was practically the same language as that used in General Orders, No. 14, which had been the original authority for the creation of the Finance Section and apparently limited the Accounts Department to "supervision and coordination." The intended expansion of the department into an operating organization did not take place at once. Attention was devoted principally to supervising the preparation of appropriation estimates and to issuing the daily financial report. In addition, the department kept in touch with the activities of the finance sections in the supply bureaus and to a certain extent helped to guide them, but no direct action toward bringing about standardization of methods or consolidation of the sections was undertaken.

The Accounts Department accomplished little during the brief period of its existence and its activities gradually dwindled to insignificance. On October 11, 1918, by Supply Circular No. 98, it was abolished entirely. In its place, however, there was set up, by the same order, a new Finance Department with much greater authority and with powers of an actual operating organization. The Finance Department was to be headed by a Director of Finance, charged with responsibility for and authority over the preparation of estimates, disbursements, money accounts, property accounts, finance reports, and pay and mileage of the Army. The Director of Finance was further empowered to issue directions as to the order of consolidation of the activities placed under his jurisdiction, together with such other instructions, regulations and orders as might be necessary to carry out these powers.

It will be noted that the Director of Finance was thus given authority not only over the entire financial activity of the War Department in general terms, but power explicitly stated to bring about in his own office a complete consolidation of these activities. His authority was not limited to the financial transactions of the supply bureaus, but included also the activities, personnel and equipment of the finance sections of the General Staff and other separate services of the Army.

The consolidation of the finance activities of the War Department was the logical result of the steadily increasing consolidation of procurement under the Director of Purchase. It was made evident that the consolidation of finance was expected to keep pace with the consolidation of procurement, and in practice this was the general policy followed. Lack of quarters, however, made it impossible to bring about a physical consolidation of the finance sections of the various bureaus as rapidly as they were placed under the jurisdiction of the Director of Finance, and this handicap made it impracticable to bring about their absorption into a single homogeneous unit as rapidly as was desired.

On October 16, 1918, Finance Circular No. 1 prescribed the organization of the office of the Director of Finance. Under the Director of Finance and an Assistant Director of Finance acting as executive officer there were to be four Assistant Directors of Finance, each in

charge of a group of activities. These four groups were in turn subdivided into divisions as follows:

Administration—

Administration Division.

Personnel Division.

Financial Control—

Estimates Division.

Apportionments and Requirements Division.

Credits Division.

Accounts—

Money Accounts Division.

Property Accounts Division.

Disbursements—

Central Disbursing Division.

Pay of the Army Division.

These divisions were further subdivided into branches on the basis of the corps and departments, the business of which they were to handle. This arrangement made it possible to consolidate similar activities of the various corps into a single division and at the same time to allow these activities to be continued by the same men and under approximately the same methods of procedure as formerly.

The transfer of the finance activities of the bureaus began on October 21, 1918, when, coincident with the transfer of its procurement and storage functions to the Office of the Director of Purchase and Storage, the finance organization of the Quartermaster Corps was taken over by the Director of Finance.

It was a significant fact that the development of the Finance Department had much the same history as the development of the Office of the Director of Storage. In both cases the new organization was, to a large extent, built around the organization previously existing in the Quartermaster Corps. In the Finance Department, for example, not only were the financial activities of the Quartermaster Corps the first to be taken over, but the department was organized along much the same lines as the Finance and Accounts Division and Central Disbursing Division of the Quartermaster Corps, and Quartermaster Corps officers were to a large extent placed in charge of the various divisions. As the financial activities of the other corps were taken over, they naturally were fitted into the organization already existing or, in other words, were virtually absorbed by what had been the Quartermaster Corps, now operating under a different name.

On October 22, 1918, Supply Circular No. 99 transferred certain procurement and storage functions of the Corps of Engineers to the Office of the Director of Purchase and Storage and in accordance with the general policy of having the consolidation of finance keep pace with the consolidation of procurement, this circular also transferred to the Office of the Director of Finance all of the work of finance and accounting involved in the procurement of Engineer supplies, including both those that were transferred to the Director of Purchase and Storage and those that remained with the Corps of Engineers. With the transfer of these activities went the personnel, equipment, and records with which they were concerned.

The transfer of the financial activities of the Corps of Engineers was followed almost immediately by the transfer of the same activi-

ties of the Signal Corps by Supply Circular No. 103 of October 25, 1918; and by the taking over, on October 24, 1918, by Supply Circular No. 102, of all of the activities in the office of the Surgeon General pertaining to finance and accounting.

On November 6, 1918, Supply Circular No. 110 transferred to the office of the Director of Finance the work of finance and accounting involved in connection with Quartermaster supplies placed under the Director of Purchase and Storage and also all finance activities pertaining to the procurement of such supplies as remained with the Quartermaster Corps. No changes were necessary as a result of this action, as the entire finance organization of the Quartermaster Corps had already been taken over.

No further transfers were made before the signing of the armistice. Some further consolidation took place but this will be taken up in its proper place later.

The financial activities of the War Department outside of Washington were organized under the Director of Finance along the same lines as the field organization adopted by the Director of Purchase and Storage. Purchase and Storage Notice No. 21, of October 28, 1918, established the zone system of supply operation. Under this system the depot quartermaster in each of the general procurement zones was appointed as zone supply officer and, with certain modifications was charged with authority over and responsibility for supply activities within the zone under his jurisdiction.

Purchase and Storage Notice No. 21 stated that the Director of Finance should designate an officer as zone finance officer for each of the general procurement zones. The zone finance officer was to be under the general supervision of the zone supply officer, but on technical matters was to report to the Director of Finance, and was to be charged with such finance administration, including disbursements, money accountability, and property accountability within the zone as might be authorized and directed by the Director of Finance. Under this arrangement there were to be 13 zone finance officers in the United States in charge of financial activities of the War Department outside of Washington and acting in cooperation with the zone supply officers in charge of supply activities in the field. This system was not actually put into effect, however, until after the signing of the armistice and will be taken up later in the discussion of that period.

The Finance Department experienced but a short period of existence before hostilities ceased, and its principal activities have been carried on since that time in completing plans inaugurated just before the close of the war. It may be said in general, however, that the aim of the Finance Department from the beginning was the same as that of the former Finance Section of the Purchase and Supply Branch—that is, to bring about, under the direction of the Purchase, Storage and Traffic Division, a consolidation of the financial activities of the entire War Department. The method adopted to accomplish this end, however, was quite different from that followed by the Finance Section. The latter planned first of all to bring about a standardization of forms and methods in the finance sections of the various bureaus, so that whenever their anticipated consolidation should be regarded as desirable they would all be doing the same thing in the same way, and could therefore be brought to-

gether readily into one harmonious whole. The Finance Department, on the other hand, feeling that standardization of the diverse methods already in use was difficult to effect in the middle of a fiscal year, and particularly while the finance sections of the various bureaus remained under the administrative control of the bureau chiefs, adopted the opposite policy of bringing about consolidation first and standardization later. It, of course, recognized the fact that consolidation under these conditions would not result immediately in a unified organization, but felt that in the long run the desired end would be reached more quickly, more easily, and more effectively by bringing the various finance sections together as soon as possible and giving them an opportunity to become thoroughly familiar with each others' ways before an attempt was made to fit them all into the same mold.

The form of organization adopted by the Finance Department—principally along functional and secondarily along organizational lines—was well adapted to this general scheme of development. Under this arrangement the various finance organizations transferred to the Office of the Director of Finance were not taken over intact, but their activities and personnel were split up along functional lines and assigned to the appropriate divisions of the Finance Department. At the same time, no attempt was made to bring about an immediate consolidation of these activities within the various divisions, the part of the bureau assigned to the divisions being made a separate branch and allowed for the time being to continue to handle its work in the way in which it had been accustomed. The next step toward unification was obviously to do away with the independence of the various branches in the same division by reorganizing them along functional lines. This step was not taken until later.

The action taken in the centralization of finance took a somewhat different form than that which was followed in regard to other parts of the supply system. It contemplated the creation of a completely separate organization for the performance of a highly specialized service for all departments and corps of the Army. The faults which led to its establishment and the benefits resulting from its operations as a single agency were identical with these which were found in regard to all other phases of the bureau system of supply.

REORGANIZATION OF AUGUST, 1918.

Reference has been made in various places in the preceding pages to the reorganization of the Purchase, Storage and Traffic Division which took place in the latter part of August, 1918, and the effects of that reorganization upon the principal parts of the supply supervisory agencies have been included in the accounts which have been given of these agencies in order not unduly to interrupt the narrative. It now becomes appropriate to summarize these changes and to set forth the formal organization which was effected at this time.

The reorganization extended beyond the limits of the Purchase, Storage and Traffic Division and extended to the whole General Staff, amounting to a restatement and clarification of the position of the General Staff in relation to the Military Establishment. The changes which took place are set forth in General Orders, No. 80,

War Department, August 28, 1918, and Supply Bulletin No. 29, November 7, 1918.

GENERAL PLAN OF ORGANIZATION.

Coordinating authority in so far as it related to the field of supply was vested in the Purchase, Storage and Traffic Division of the General Staff, in charge of the Director of Purchase, Storage and Traffic, who was designated as Assistant Chief of Staff. He was given cognizance and control of the following:

(a) The supervision and direction of all requirements and the procurement and production activities, including real estate, of the several bureaus, corps, and other agencies of the War Department; the coordination and correlation of the requirements and the procurements and production activities of the several bureaus, corps, and other agencies of the War Department; the maintenance of an estimate of the military resources of the Nation respecting material of every description; the representation of the Army in all arrangements for coordinating the requirements, procurement, and production activities in the several bureaus, corps, and other agencies of the War Department, with other agencies of the Government and with the Allies, including replacements of material pertaining to the Army with the latter; the determination of purchasing and manufacturing priorities between the several bureaus, corps, and agencies with the War Department, and in relation to other agencies of the Government; the determination of priorities to be afforded to contractors for supplies in the matter of the shortage of fuel, power, and raw material; the supervision and coordination of all fiscal accounting systems and appropriations, estimates and requirements, and other financial matters relating to the purchase of the munition and all other supplies; the supervision of the computation of the requirements and rates of production necessary to provide types and quantity of equipment as determined by the Operations Division. Statements of the type and quantities of equipment and supplies for all branches of the Army shall be furnished the several bureaus by the Operations Division. It shall then be the duty of the Supply Bureau, under the supervision of the Director of Purchase, Storage and Traffic to compute the requirements and rates of production necessary to provide equipment and supplies, in the quantities, at the places, and within the time determined by the Operations Division.

(b) The storing and warehousing of property for all departments, bureaus, and corps of the Army, both at interior points and at the seaboard, and the operation of all storage facilities provided for the joint use of all bureaus of the Army.

(c) All that pertains to the routing, inland and coastwise, of troops and property of the War Department, by motor, rail, or ship, and the conduct of all negotiations with inland carriers with respect to questions affecting such transportation; the movement of all property of the War Department to prevent congestion and to obtain preferential movements thereof; coordination of rail movements required in the handling of supplies destined for shipment overseas with shipments by the Allies.

(d) The transportation of troops and supplies overseas, embarkation and oversea service relating to the Army program, including the employment of all Army transports, harbor floating equipment and new construction in connection therewith, except the construction and control of floating equipment operated by the Corps of Engineers for river, harbor, and fortification work, and the control of the Army mine-planter service; such commercial shipping as may be used to supplement that service, including all arrangements with the Navy Department for convoy service; all primary ports of embarkation, expeditionary ports, and concentration camps connected therewith; courier service between the War Department and General Headquarters, American Expeditionary Forces.

(e) Direct correspondence between the Director of Purchase, Storage and Traffic or the chief of embarkation and the commanding officers of ports of embarkation is authorized. Copies of all requisitions, requests, and information of every character received from the commanding generals of forces operating overseas, or their subordinates, which bear upon reenforcements or removals of supplies will be transmitted to the Director of Purchase, Storage and Traffic.

Supply Bulletin No. 29, issued on November 7, 1918, contains a complete synopsis of all phases of the reorganization of the supply system of the Army. Its résumé of the evils attendant upon the old bureau system has already been set forth in the preceding pages. Its description of the new organization which was set up makes reference to several supply circulars (especially Supply Circular No. 30 of August 27, 1918, and Supply Circular No. 86 of September 5, 1918) and contains a set of charts which show the framework after it had been fully established.

In regard to the initial organization of the Purchase, Storage and Traffic Service it was said:

It is true that an organization of the General Staff had been set up to coordinate the work of the bureaus, and that it had accomplished some good in this field. Its powers were, in the main, supervisory only, and, as has been pointed out, the organization did not lend itself readily to supervision. Furthermore, supervision tends to envelop and duplicate executive control and to create conflict of authority and divided responsibility, especially where the supervisory organization has administrative powers. It is naturally much weaker than single responsibility and executive control.

The nature and powers of the new organization were established in the following language:

At the head of the organization is a Director of Purchase, Storage and Traffic, whose function is executive and not supervisory. He receives the Army program from another division of the General Staff, and his is the responsibility for the computation of the requirements to meet that program and the filling of these requirements. He is in command of the supply organization and relieves the Chief of Staff from all detail of and responsibility for supply.

The fundamental idea of this reorganization is first, the consolidation in one department of the purchase of all standard articles of merchandise, leaving in the bureaus the purchase, production, and inspection of highly technical material, such as ordnance, aircraft, etc., and second, the storage, distribution, and issue within the United States, and their storage prior to shipment abroad, of all War Department supplies, whether standard or special (including those excepted from procurement).

Based on these principles, there was set up an organization consisting of a group of supervising and directing units and a group of operating units, which constituted the Purchase, Storage and Traffic Division as it stood at the signing of the armistice. This organization outline was as follows:

Supervising units—

- Statistics and Requirements Branch.
- External Relations Branch.
- Purchase Branch.
- Production Branch.
- Executive Branch.
- Inspection Branch.
- Research Branch.

Operating departments—

- Embarkation Service.
- Inland Traffic Service.
- Office of Director of Purchase and Storage and Acting Quartermaster General.
- Facilities Department.
- Finance Department.
- Primary Ports of Embarkation.

The supervising units.—It will be noted that the former Purchase and Supply Branch had disappeared, its various component units finding a new arrangement.

Of the various branches comprised within the supervising units, four have already been mentioned, namely the Statistics and Requirements Branch, the External Relations Branch, the Purchase Branch and the Production Branch. The Statistics and Requirements Branch took over the functions of the former Supplies Accounting Section, Purchase and Supply Branch, becoming charged with general responsibility in statistical matters. It also took over from the former Supply Program Section the supervising and coordinating of requirements calculations in the supply bureaus. The External Relations Branch took over the functions of the former Supply Program Section which were concerned with relationships with the War Industries Board, including price fixing, clearance, and priorities. The Purchase Branch took over most, though not all, of the personnel and duties of the former Purchase Section. The Production Branch was identical with the former Production Section except in unit designation.

The Executive Branch was set up to maintain general oversight of the developing organization as well as to issue orders and instructions affecting organization.

The work of the new Inspection Branch consisted of two parts; it exercised a general supervision over the inspection of all army supplies, and in particular cases where difficulties arose on matters of inspection the solution was furnished by the Inspection Branch. A comprehensive study of the whole problem of army inspection was made by this branch and recommendations in the direction of centralizing in one organization inspection functions for all army supplies, were offered, but due to the termination of hostilities nothing was actually done toward putting into effect the recommendations which were directly in line with the principle underlying the reorganization of the supply service.

The Research Branch under the name of the Bureau of Industrial Research had been developed in close association with the Director of Purchase, Storage and Traffic. Its general task was the saving of packing and crating, the more efficient baling of clothes and other compressible supplies, etc.

The operating departments.—In addition to the supervising units there were the regular operating departments, all reporting to the Director of Purchase, Storage and Traffic. The history of the Embarkation Service, the Inland Traffic Service, the Finance Department and the Facilities Department has already been traced. Coordinate with the other departments were placed the Primary Ports of Embarkation (New York and Newport News), as operating organizations reporting to the Director of Purchase, Storage and Traffic. Some account of these ports of embarkation has been given in connection with the Embarkation Service.

The most striking and important development of the reorganization was the establishment of definite machinery for the central procurement of standard supplies. In doing this two alternatives were offered, first, to create a new organization, or second, to reorganize and adapt the office of the Quartermaster General to the present plan,

to use it as the central office for Purchase and Storage, and to bring commodity sections from other bureaus over to the commodity sections of the Quartermaster Department, where most of them already were. The second alternative was adopted and the office of the Quartermaster General was reorganized to meet the needs of the Director of Purchase and Storage. An outline of this adaptation now becomes necessary to complete the survey of the development under the Purchase, Storage and Traffic Division during the war.

DEVELOPMENT OF OFFICE OF DIRECTOR OF PURCHASE AND STORAGE.

On October 21, 1918, the Quartermaster Corps and the Office of the Director of Purchase and Storage became one and the same organization and the consolidation brought together the greater part of the procurement and storage functions of the supply system in the United States. The new arrangement functioned but a short time before the signing of the armistice and the chief interest in the process lies in the evolution which had taken place within the Quartermaster Corps which made it possible by minor adaptations to make that corps the operating agency in procurement. The development of storage control out of the Quartermaster Corps at the beginning of 1918 and its reunion with it upon the setting up of the Office of Director of Purchase and Storage and Acting Quartermaster General has already been described.

Evolution of the Quartermaster Corps during the war.—The Quartermaster Corps at the outbreak of war most nearly constituted the supply agency of the War Department in so far as any bureau might be said in any degree to approximate a single agency. Its primary function was that of furnishing to the army the clothing, the food, and most of its equipment except ordnance. This involved the purchase and distribution of a multitude of subsistence and equipment items, vehicles and harness, hardware and metals, fuel and forage, remounts, the operation of laundries and repair shops, etc., and a great amount of financial business, including property accountability and pay of the Army. In addition to these duties, however, the Quartermaster Corps was charged with a number of other functions which added greatly to its burdens. Among these was the construction and repair of all buildings erected or maintained by the Army, the handling of the movements of troops and property by land, and the operation of the Army Transport Service by sea, and the business of motor transportation which had assumed large proportions in the operations in Mexico in 1916 and which grew to still greater proportions in the present war.

At the outbreak of war the Quartermaster Corps found itself in the same situation as all the other purchasing bureaus of the Army but its position was particularly critical because it was charged with the initial task of providing the immediate needs of the new Army. Its problem of supply was essentially the same as that of the other bureaus but at the beginning more highly intensified. In order to work out a plan by which supplies should always be available when needed, both in this country and abroad, it was necessary to consider carefully the amount of time required for transportation of supplies from manufacturers to depots, from depots to camps, and from depots to troops abroad. An even more important problem was that

of determining the time required to obtain supplies after orders had been placed with factories, and oftentimes difficulties necessarily resulted because of an underestimation of this time or because of delinquencies in factories themselves. At the beginning of the war it was peculiarly true that factories in certain parts of the country were given contracts for much more than could actually be produced in their plants.

The proper allocation of contracts, the determination in advance of the allocation of contracts as to whether raw materials were available for the actual manufacture, were matters which had to be worked out in great detail. For example, the problem with respect to woolen clothing was not merely the problem of the purchase of a supply already existing; it was a problem of determining first, how many uniforms were needed and when and where needed; second, of making sure that the wool was available for the manufacture of such uniforms—and this constituted one of the most serious problems; third, the placing of contracts for the obtaining of such uniforms; and fourth, the delivery of the uniforms to the places where they were actually needed. If any one of these items caused difficulty, the whole supply program was affected. The problem of obtaining, manufacturing, and supplying quartermaster supplies for the Army at home and abroad was therefore tied up with the whole system of national industry and of inland and ocean transportation.

At the beginning of the war the Quartermaster Corps' purchasing system was largely decentralized, each depot buying more or less independently and supplying posts, forts, and other military establishments in accordance with a published plan. This decentralized system of purchasing necessarily had to be controlled when the Government came to use substantially all of the manufacturing resources of the country.

In the early months of the war, some effort to meet this situation was made, as has been seen, through the Council of National Defense. The Secretary of War approved a certain list of articles which were to be purchased exclusively through the Council of National Defense. This list was prepared by the Committee on Supplies of the council and included woollens, cotton, leather, rubber goods, etc. All purchasing quartermasters were notified that they were not to place any orders for any of these articles excepting in case of emergency, where they were required for immediate delivery. Whenever articles on this list were required for the Army, a letter was written to the Council of National Defense, stating the quantity of each required and requesting that the depot quartermaster at Philadelphia (where the purchase of all these articles was largely focussed) be advised as to where these articles might be obtained, price, and rates of deliveries. The committee on supplies then proceeded to obtain quotations, either by submission of formal bids or by informal inquiries. The recommendations of the committee on supplies were then forwarded to the depot quartermaster at Philadelphia, who placed orders direct with the contractor. It was not until this had been done that copies of such orders were forwarded to the office of the Quartermaster General.

For several of the early months of the war the Quartermaster Corps, in regard to important groups of supplies, was thus subjected

to the domination of the Council of National Defense, through its Committee on Supplies. While the plan undoubtedly held some advantages in that the services of the experts of the Committee of Supplies were brought to bear upon the procurement of vital war materials, nevertheless it secured these advantages at the expense of the Quartermaster Corps and had a demoralizing effect upon that organization. When the Committee on Supplies of the Council of National Defense went out of existence, about the beginning of 1918, the work this committee had performed was turned back to the Quartermaster Corps and it was arranged that coordination and supervision of purchase should be effected by the agencies within the War Department whose creation and development have already been described.

From January on the history of the Quartermaster Corps was an evolution toward a purchase and distribution service, which made it possible, when consolidation with Purchase and Storage took place, to effect the change with a minimum of disruption of existing arrangements. There were two phases to this evolution. One was the splitting off from the Quartermaster Corps of services which were foreign to the purchase function; the other was the consolidation of the procurement of a large number of articles of supply within the corps and the adjustment of its internal machinery to take care of the process.

Separation of services from Quartermaster Corps.—In order to relieve the Quartermaster Corps of a number of functions which were alien to the procurement task and which grew to such large proportions with the existence of war as to seriously embarrass any single organization charged with their control, the services of construction and repair, land and water transportation, motor transportation, and finally finance were removed from its jurisdiction. The circumstances connected with these separations have been discussed already in connection with the accounts of the various services in which they resulted.

With the beginning of war the problem of construction became one of very great importance, and required necessarily much more attention than could be given to it under the previous organization of the Quartermaster Corps. On May 16, 1917, the Chief of Staff and the Secretary of War approved a recommendation that an officer be charged with the exclusive work of cantonment construction, and on May 17 the Quartermaster General detailed an Officer in Charge of Cantonment Construction, and recommended that while in charge of this work he be given special authority to report directly to the Secretary of War, to communicate directly with department and division commanders by order of the Secretary of War, and to issue travel orders. These recommendations were approved, and the work of construction, while still subordinate to the Quartermaster Corps as regards appropriations and personnel, became a substantially independent organization which came to be known as the Cantonment Division. On October 10, 1917, the Construction and Repair Division of the Office of the Quartermaster General was abolished, and all of its duties transferred to the Cantonment Division. Under date of February 12, 1918, the Cantonment Division was attached to the Operations Division of the Office of the Chief of Staff, and on March

13, 1918, by order of the Secretary of War, the name of the division was changed to the Construction Division. The work of construction ceased to be a quartermaster function, and was set up as an independent war activity.

The organization of a general supervision with respect to purchase, storage and traffic naturally required some change in the organization and functions of the Quartermaster Corps. The function of purchase and the function of storage necessarily remained as functions to be performed by the Quartermaster Corps with respect to quartermaster supplies. It was equally necessary that the functions of railroad and water transportation should be taken over by the central agency substantially in their entirety, and this was actually what occurred. The Inland Traffic Service succeeded the Land Transportation Branch of the Transportation Division of the Quartermaster Corps and on April 22, 1918, the Water Transport Branch was transferred to the Embarkation Service, and within the Quartermaster Corps the Transportation Division was abolished on June 15, 1918, and its remaining functions reassigned to other divisions.

With the development of motor transport needs, a separate motor transport division was created in the Quartermaster Corps; and by General Orders, No. 38, War Department, April 18, 1918, the Motor Transport Service as a part of the Quartermaster Corps was definitely organized under an assistant to the Quartermaster General. It was made the function of the Motor Transport Service so organized to have supervision over "all motor-propelled vehicles except tanks, caterpillars and other artillery tractors." The purchase of non-specialized motor equipment was thus consolidated into the hands of the Motor Transport Service, and in addition the Ordnance Department was instructed to confer with the Chief of the Motor Transport Service in the purchasing of special types of vehicles. The Motor Transport Service thus became a purchasing and controlling agency for the whole War Department and ceased to be a definitely Quartermaster Corps activity in the sense of being limited to the service of that corps. On August 15, 1918, the separation was made complete by General Orders, No. 75, War Department, 1918, which constituted an independent Motor Transport Corps.

The removal of finance functions from the Quartermaster Corps was the last separation to take place, near the end of the war, and has already been sufficiently described in connection with the Finance Department.

Consolidation of procurement in the Quartermaster Corps.—The second phase of the evolution of the Quartermaster Corps into a purchase bureau began with the consolidation of procurement which brought the purchase of many of the items of supply of the Army under its jurisdiction.

By General Orders, No. 8, War Department, 1918 (January 19, 1918), General Orders, No. 23, War Department, 1918 (March 4, 1918), and General Orders, No. 53, War Department, 1918 (May 27, 1918), the Quartermaster Corps became the War Department agency for procuring and distributing fuel and oil for the Army, except for those lubricants which were used for aircraft and aircraft guns and which required governmental assistance in production or manufacture. When the food and fuel control law was passed, on

August 10, 1917, in response to the urgent necessity for a central supervision over fuel for military uses, for Army, manufacture, and for private use, the Quartermaster Corps activities with respect to fuel were thereafter conducted through and in close cooperation with the Fuel Administration. This relationship was more closely cemented by the consolidation of all fuel and oil purchases in the Quartermaster Corps.

Under the provisions of the same law above referred to, the Food Administration was created, and in the purchase of food for the Army, the Quartermaster Corps acted in close cooperation with that organization. The Quartermaster Corps also cooperated closely with the Food Administration in the purchase of forage.

With the organization of the Purchase, Storage and Traffic Division, a more definite activity began with respect to supervision over consolidated Army purchasing. On May 8, 1918, the Purchase and Supply Branch began the issuance of a series of supply circulars whose purpose was the consolidation of procurement and a consolidated supervision over the procurement of War Department supplies. Under these supply circulars the general policy was to consolidate all Army purchasing into the hands of a particular supply bureau, where that supply bureau was already purchasing the major part of a particular article of supply for the Army.

The general procedure to be followed under the new system was laid down in Supply Circular No. 2, May 8, 1918, under the provisions of which each supply bureau was to continue to be responsible for the determination of requirements, designs, and specifications, and for the issue to the service of the same articles as previously, these articles being delivered to it by the procuring bureau for such issue. The other supply bureaus were to make known their requirements to the procuring bureau by means of a procurement requisition on the latter, at the same time transferring to it the estimated amount of funds required for the purpose. In accordance with the procurement requisition, the procuring bureau was to be solely responsible for making purchases, following production, conducting inspection, and making acceptance of and payment for the articles placed in its charge.

The process of consolidation of procurement began at once, and was effected by groups of articles. The first consolidation to effect the Quartermaster Corps became operative June 3, 1918, and other consolidations were put into operation successively on June 10, July 10, August 1, 10, and 31, September 6, and 17, and October 15, 1918. As a result of this process there was consolidated in the Quartermaster Corps the purchase of a great number and variety of articles which made it the most important purchasing agency of the Army. The list included the following items:

Hand-drawn, animal-drawn, motor-propelled, and wooden vehicles, automotive trucks and fire apparatus, and trailers.

Automobile and pneumatic tires.

Paper and paper bags and cartons.

Bedsteads, bunks and cots.

Blacksmiths', cobblers', farriers', general, marine, saddlery, wheelwrights' and shelf hardware, and hardware supplies.

Soap and bleaching and washing powders.

Bolts (except for use of Engineer Corps).

Ice boxes and refrigerators.

Burlap, cotton, jute, linen, silk, and woolen fabrics, goods, threads, and yarns.
 Tool chests.
 Cobblers' and garment workers' power tools and machinery.
 Cotton, manila, and sisal rope.
 Scoured and unscoured wool.
 Gun and wagon covers.
 Cutlery.
 Leather, leather goods, and leather equipment.
 Forage.
 Rubber goods and tires.
 Hand tools.
 Horseshoes and horseshoe nails.
 Janitors' supplies.
 Jute.
 Tableware, kitchenware, and mess equipment.
 Needles.
 Office supplies and equipment.
 Paulins.
 Stoves and ranges.
 Subsistence.
 Tobacco.

Along with the conferring of such a vast amount of purchase business upon the Quartermaster Corps went a series of organization changes which made it more perfectly and exclusively a purchasing agency. During the early months of the war there was a natural development by expansion, new divisions being formed out of former subdivisions when the functions with which they were charged grew to the point of requiring separate control. At the end of January, 1918, however, a complete reorganization was effected, making the corps more nearly a purchasing machine. There were established the following divisions:

1. The General Administrative Bureau.
2. Quartermaster Supply Control Bureau.
3. Personnel and Planning Staff.
4. Reclamation Division.
5. Supply and Equipment Division.
6. Subsistence Division.
7. Fuel and Forage Division.
8. Remount Division.
9. Motor Division.
10. Warehousing Division.
11. Cantonment Division.

The Cantonment Division as previously explained, reported directly to the Secretary of War. The only operating divisions not having purchasing functions were the Reclamation Division and the Warehousing Division, the latter of which directed, of course, the necessary task of distribution.

About the middle of April, 1918, another reorganization was effected which tended further to make the Office of the Quartermaster General a purchasing, planning, and distributing organization. The set-up at this time was as follows:

1. Administrative Division.
2. Personnel Division.
3. Finance and Accounts Division.
4. Methods Control Division.
5. Supply Control Division.

6. Supply and Equipment Division.
7. Fuel and Forage Division.
8. Remount Division.
9. Motor Transport Division.
10. Transportation Division.
11. Depot Division.

This plan, with the modifications which will not be noted, formed the basis of organization until the Office of the Quartermaster General was combined with the Office of the Director of Purchase and Storage. On June 15, 1918, the Transportation Division was abolished. In May the Supply and Equipment Division was changed to the Clothing and Equipage Division and a further splitting of functions occurred in the establishment of separate Hardware and Metals, and Vehicles, and Harness Divisions. On June 12, 1918, the financial activities of the Quartermaster General's Office were organized under an assistant to the Acting Quartermaster General in charge of finances. By this arrangement the Office of the Quartermaster General was relieved from anything but a supervisional direction of these activities, which were later transferred bodily to the Finance Department. On June 14, 1918, there was another reorganization effected which had to do, however, more with control than with a change in divisions. By this order, which became necessary by the fact that the business had grown to such proportions that single executive direction became an impossibility, there were set up four assistants to the Acting Quartermaster General in direct charge over certain parts of the work. On August 15 the Depot Division became the Operations Division (in charge of storage functions), and, on September 21, a Motor Vehicles Division was formed. On September 18 there was organized the important Requirements Division, which was charged with the determination of requirements of articles procured under the direction of the Acting Quartermaster General.

This was practically how the Office of the Quartermaster General stood when a month later it was incorporated into the Purchase and Storage Service. The original office had lost all control over transportation, construction, finance, and accounting, and of the organization as it existed at the outbreak of war, only the Administrative and the Supplies Division remained. The Supplies Division, which at that time had consisted of but two branches, had grown to consist of nine purchasing divisions, organized on commodity lines. The office, outside of purely administrative or planning and control branches, was purely a purchasing machine.

One other matter requires notice. At the beginning of the war the Supplies Division had had two small branches which did not to any large extent actually control procurement. All procurement activities were decentralized to such an extent that each department, camp, post, and station of the Army made its own purchases of practically everything except uniforms and certain major articles. Early in 1918 a movement was started to centralize control over local procurement and place it under the control of the Quartermaster depots located at certain important purchasing centers and on July 1, 1918, 13 zones of procurement, known as general supply zones, were created. In addition to these 13 general supply zones, there were 13 subsistence procurement zones which, in most instances, were identical

with the former. The officers in charge of these zones—the zone supply officers—were given certain purchasing powers, as indicated in the following extracts:

The procurement, production, manufacture, inspection, storage, and distribution of Quartermaster supplies shall be performed by the general supply depot quartermaster (now known as the zone supply officer) acting under the direction of the Office of the Quartermaster General through its several procurement divisions, the number of which is dependent upon the volume of business and conditions concerning each class of supplies and operations. The several procurement and operation divisions in the Office of the Quartermaster General shall be located at Washington * * * or at some other point suitable for properly transacting the business. A general supply depot may, if necessary, be designated as the central agency for a certain class of supplies or operations.

Contracts or purchases shall be made by the general supply depot quartermaster (now the zone supply officer) when authorized by the proper procurement division in the Office of the Quartermaster General.

In addition to the above, there were organized in 1918 five remount procurement zones, which number was later decreased to three.

At the same time as the procurement zones were established, there were set up a corresponding group of distribution zones in charge of the distribution of various supplies to the camps in this country under their jurisdiction.

This system of zones, which was later carried over for use under the Director of Purchase and Storage, served to decentralize the actual operations of procurement and distribution, while at the same time the lines of control were tightly held in the various divisions of the Office of the Quartermaster General in Washington.

Organization of Office of Director of Purchase and Storage and Acting Quartermaster General.—On October 21, 1918, the consolidation of the Office of the Quartermaster General with the Office of the Director of Purchase and Storage, which then came into existence, actually took place, although the authority for it had been issued previously. In Supply Circular No. 80, of August 27, 1918, which had set forth the reorganization of the Purchase, Storage and Traffic Division, it was provided that:

The Quartermaster General of the Army shall report to the Director of Purchase, Storage, and Traffic.

The Quartermaster's Department, in addition to its other duties, shall have responsibility for and authority over storage distribution and issue within the United States of all supplies for the Army.

This provision was modified on September 12, 1918, by Supply Circular No. 91, which provided that:

The Quartermaster General of the Army, as Director of Purchase and Storage, shall have responsibility for and authority over storage, distribution and issue within the United States of all supplies for the Army.

It provided at the same time for the appointment of a Director of Purchase and a Director of Storage, both to report to the Director of Purchase and Storage.

Purchase and Storage Notice No. 1, dated October 19, 1918, provided the initial organization of the Office of the Director of Purchase and Storage. The organization of the Office of the Quartermaster General as it existed at this time served as the foundation. In addition to an Administrative Division and a Requirements Division, there were grouped within the Office of the Director of Purchase a number of procurement divisions, and within the Office of

the Director of Storage an organization for the operation of storage and distribution activities.

Soon afterwards, however, a new set-up was established, which continued in effect until the end of hostilities. This was described in Purchase and Storage Notice No. 19 of October 28, 1919, which followed the main headings previously established, but subdivided operations as follows:

1. The Office of the Director of Purchase and Storage.
2. Office of the Executive Officer, and under and reporting to the Executive Officer were the General Administration Division, the Statistical Division, and the Surplus Stocks Division, the latter being a new division organized for the purpose of disposing of surplus property owned by the War Department.
3. Office of the Chief of Requirements.
4. Office of the Director of Purchase with the following divisions reporting to it: The Purchase Administrative Division; Clothing and Equipage Division, Subsistence Division; Motors and Vehicles Division; Machinery and Engineering Materials Division, which took over the procurement activities of the Engineer Depot; the Raw Materials Division; the Medical and Hospital Supplies Division, which took over the procurement activities of the Surgeon General's office; the General Supplies Division; the Remount Purchase Division.
5. Office of the Director of Storage, with the following divisions reporting: Storage Administrative Division, Domestic Distribution Division, Domestic Operations Division, Overseas Distribution Division, Port Operations Division, and Salvage Division.

The Office of the Director of Purchase and Storage thus became the great operating machine for procurement, storage and distribution. Within it, the Office of the Director of Storage took over all the storage activities of the Army, while the Office of the Director of Purchase made arrangements to take over all procurement activities of the Army save the purchase of highly technical equipment and instruments, which were purchased by the Ordnance Department, Bureau of Aircraft Production, Chemical Warfare Service, and other branches of the Army which had charge of supplies and instruments which had not been standardized. Pursuant to this plan, the transfer of the procurement activities of the Depot Department of the Engineer Corps, except for certain articles, to the Office of the Director of Purchases was provided for by Supply Circular No. 99, October 22, 1918; the transfer of the Supply Division of the Office of the Surgeon General by Supply Circular No. 102, October 24, 1918; and the transfer of the Supply Division of the Signal Corps on October 23, 1918, by Supply Circular No. 103. The transfer of the procurement function of the Quartermaster Corps to the Office of the Director of Purchase, already practically in effect, was formally confirmed on November 6, 1918, by Supply Circular No. 110.

The consolidation of procurement into a central purchasing agency, while hardly realized before the war came to an end, was a great achievement from the point of view of the reorganization of the supply system of the Army and of the elimination of the wasteful and unbusinesslike methods of buying which were the inevitable results of the uncoordinated activities of the bureaus. The problem of organization was solved and the precedent of centralization was established.

READJUSTMENTS SINCE THE ARMISTICE.

READJUSTMENTS OF FUNCTIONS TO MEET THE PROBLEMS CREATED BY THE TERMINATION OF HOSTILITIES.

When, on November 11, 1918, the firing ceased on the fighting front as a result of the signing of the armistice, all the forces and energies of supply, which during the preceding months had been laboriously galvanized into tremendous action, had to be brought suddenly to a halt, and there were created by this immediate shutting down of the war machine new and burdensome problems. Millions of dollars worth of war contracts had to be terminated and adjusted, vast parcels of real estate, which had been rented or otherwise acquired by the War Department in connection with the necessity of providing adequate facilities, had to be evaluated and properly disposed of; numerous claims of various sorts against the department which had been inevitably incident to its unprecedented undertakings had to be adjusted; great quantities of war stocks and materials which had been necessary during the continuance of war in order to assure adequate supply at all times now became surplus and had to be sold; the whole process of embarkation and shipment had to be reversed; and generally the whole question of peace-time organization of the supply system of the Army, which had received such striking modification during the war, with all its attendant phases of procurement, calculation of requirements, standardization of material, storage, distribution, and transportation, was presented for consideration.

Contract adjustment.—One of the most pressing problems which required immediate attention was the termination and adjustment of contracts under the provisions of which the war industries of the country were turning out supplies with feverish activity. On the signing of the armistice there were within the War Department in the neighborhood of 25,000 to 30,000 of such contracts which it was necessary and desirable promptly to terminate.

In the making and fulfillment of contracts, obviously, in spite of the most scrupulous care and desire to render full justice many claims and disputes are bound to arise. Fortunately, machinery had already been set up within the Purchase, Storage and Traffic Division to handle disputes, claims and doubts arising under war contracts and procedure to terminate such contracts in the public interest had already been laid down for inclusion in the contracts when made.

As has already been pointed out in an earlier part of this report it was required by Supply Circular No. 88, dated September 7, 1918, that there be included in every contract negotiated for the War Department prescribed provisions for cancellation and termination before completion. These provisions covered cancellation for contractor's default, termination in the public interest, assignment of subcontracts and taking possession of contractor's plant. Referring particularly to termination in the public interest, Supply Circular No. 88 established definitely the payments to be made by the United States in the event of such termination, for articles completely manufactured at the time and for raw materials, for articles in process of manufacture and for the contractor's outstanding obligations incurred in good faith in connection with the performance of the contract.

Provision was also made for payment by the United States to the contractor of a fair amount on account of depreciation or amortization of plants, facilities and equipment provided by the contractor for the performance of his contract. In return, the United States was to be released from its obligation to take the remaining articles specified in the contract and to pay anticipated profits to the contractor on the unfinished portions of the contract. The contract provisions were worked out with considerable care to meet the situations presented both by fixed-price contracts and cost-plus contracts.

A large number of contracts entered into prior to the issuance of the above supply circular did not specifically provide for termination in the public interest. It was assumed that when it became necessary to terminate such contracts in the public interest, the parties would generally desire to adjust their rights on the basis of the equitable principles established by the provisions of Supply Circular No. 88.

Supply Circular No. 88 also provided that any claims, doubts, or disputes which might arise under a contract and which were not disposed of by mutual agreement might be determined by petition of the contractor to the Secretary of War or his duly authorized representative or representatives. As the representative of the Secretary of War to have jurisdiction in such matters, the Board of Contract Adjustment had been set up by General Orders, No. 103, War Department, November 6, 1918. This board consisted of three members having the rank of lieutenant colonel and was empowered to conduct hearings and reach decisions promptly and on principles of equity without the delays and technicalities which frequently attend litigation in the courts. It was believed that in most instances contractors would be satisfied with the decisions thus rendered and would not find it necessary to avail themselves of their rights to resort to the Court of Claims.

There were also in existence in the various supply bureaus the boards of contract review, which had been set up in the period from July 8 to July 26, 1918, at the instigation of the Supervisor of Contracts, who had been appointed by the Secretary of War on June 14, 1918. These boards were later placed under the Purchase Branch when the reorganization of the Purchase, Storage and Traffic Division took place and were given official recognition by Supply Bulletin No. 21, on August 16, 1918. These boards had been of great value in seeing that the contract and purchase policies established by the War Department were carried out in a uniform and consistent manner, and were therefore in a position to assist materially in the process of adjusting war contracts.

It is thus apparent that there was ready for use within the War Department valuable machinery for the performance of this important task.

Two days before the armistice was signed specific instructions were issued concerning the termination of contracts and orders in the public interest. Supply Circular No. 111, November 9, 1918, laid down the procedure to be followed. It directed that whenever such a contract or order contained express provision for termination, that provision was to be followed unless it was deemed in the public interest to effect termination according to the provisions of this circular and agreement of the parties could be secured. Whenever the con-

tract or order did not make express provision for termination, the contractor was to be requested to suspend work thereunder and submit a report showing in detail data upon which to base an estimate of his outstanding obligations and commitments. If agreement could be reached on a just and reasonable compensation to be paid to the contractor by reason of the termination of the contract, a supplemental contract was to be entered into embodying such agreement. On the same date Supply Circular No. 112 was issued to the supply bureaus instructing them, with a view to avoiding a chaotic condition in industry and labor which might result if large numbers of contracts were suddenly reduced, to secure the advice of the War Industries Board. The Office of the Director of Purchase, Storage and Traffic was designated to have charge of such relations with the War Industries Board, and the approval of the director was required before the suspension of certain contracts was ordered. This circular received further interpretation in Supply Circular No. 114, on November 13, 1918. Supply Circular No. 125, of December 3, 1918, set forth desirable forms for supplemental agreements.

The problem of contract adjustment, however, was not confined to the comparatively simple termination of regularly consummated agreements. The important phase of dislocation of industry and the labor market already mentioned had to be considered. In addition there was an even more serious complication which called for relief. Due to the imperative necessity for speed during the war, many agreements had been entered into during its progress which did not receive the binding sanction of a valid contract. Relying upon the good faith of the War Department, producers of this class had gone ahead on the basis of these arrangements, thus avoiding the serious delays which would have been caused by their insistence upon formal agreements. The number of these "invalid" contracts was large, and when the time for settlement arrived the interests of many war manufacturers were jeopardized by a decision of the Comptroller of the Treasury which prohibited the payment by the Government of their claims.

The existence of these perplexing questions and others made plain the necessity for the establishment of an agency with broad powers to lay down equitable policies and supervise their execution. This necessity had been realized by the Purchase, Storage and Traffic Division immediately upon the cessation of hostilities, and there had been set up within the Purchase Branch, on November 27, 1918, an Advisory Board on Sales and Contract Termination. On January 20, 1919, however, by War Department Circular No. 26, there was appointed the War Department Claims Board "to supervise and co-ordinate the work of the various War Department agencies engaged in the settlement of claims resulting from the termination of contracts or other procurement obligations of the department consequent upon the suspension of hostilities and to authorize and approve such settlements." The Assistant Secretary of War was made president of the board, with the Assistant Director of Munitions, the Director of Purchase, Storage and Traffic, and certain additional officers as other members.

About the same time curative legislation in regard to the invalid contracts was initiated in Congress, and on March 2, 1919, the so-

called Dent Act was approved. The purpose of this act was "to provide relief in cases of contracts connected with the prosecution of the war and for other purposes," and conferred upon the Secretary of War full authority to adjust all contracts both valid and invalid.

The War Claims Board was by General Orders, No. 33, War Department, March 3, 1919, made the agency of the Secretary of War to carry out the purposes of the Dent Act, and it was authorized to make use of the Board of Contract Adjustment and of existing agencies in the respective bureaus where contracts were made. These powers and duties were restated in General Orders, No. 10, War Department, March 19, 1919, with the added provision that they might be exercised by any individual member of the board under its authority and direction.

The procedure which was to be followed in carrying out the functions of the War Claims Board, together with forms for statements of claims, certificates of examinations, awards, etc., was set forth in great detail in Supply Circular No. 17, revised, March 26, 1919. Briefly, this procedure was as follows. All contracts under which claims for compensation might arise were divided into two classes:

Class A.—Claims based on agreements made by an officer or agent acting under the authority, direction, or instruction of the Secretary of War, and the nature, terms, and conditions of which had been reduced to contract form or are otherwise established by written evidence, i. e., claims where there was evidence of a contract existing in writing.

Class B.—Claims based on all other agreements covered by the provisions of section 1 of said Act, i. e., claims where it was necessary to prove the existence of a contract by oral evidence.

In connection with the adjudication of these claims, it was decided to use the agencies already in existence. All Class A claims were to be handled by the existing bureau boards of contract review, whose functions and personnel were so modified as to constitute them claims boards, some of which found it necessary to establish branches in various parts of the country. One member of the War Claims Board was in constant liaison with these boards and indicated the approval of the Secretary of War by signing the awards. It was considered that the Class B claims on account of their nature required legal talent and more formality in hearing. They were therefore assigned to the jurisdiction of the existing Board of Contract Adjustment. The same control by the War Claims Board was exercised through a liaison member as in the case of Class A claims, and approval of the Secretary of War was indicated by signature for the board.

One further existing agency was utilized in connection with the settlement of war claims. Under General Orders, No. 30, War Department, 1918, there had been established, as already pointed out, a Board of Appraisers within the Purchase, Storage and Traffic Division for the determination of just compensation for all property of whatever kind which had been requisitioned or commandeered during the emergency. The Board of Appraisers in carrying out these duties had built up an effective, trained organization, and the advantage of using this organization in the valuation of property involved in claims under the Dent Act was discerned. General

Orders, No. 41, War Department, March 25, 1919, was issued giving the Board of Appraisers additional authority over property "taken otherwise than by requisition, commandeering, or other summary process issued according to law, and without valid agreement fixing compensation therefor." This had the effect of turning over to the Board of Appraisers the work of fixing compensation on behalf of the War Claims Board for all property under adjudication of claim.

The War Claims Board thus not only passes on final proposed settlements or adjustments under contracts and agreements, but lays down the general policy covering such settlements or adjustments within any part of the War Department. It is the final authority with relation to these matters and the coordinating and controlling agency for all contracts and agreements to be terminated, reduced or adjusted within the War Department. The Board through the various agencies which it has used has performed a valuable service in bringing about the settlement of war claims along broad, constructive lines and has saved much time and money to both contractors and the Government in the avoidance of costly and tedious litigation.

Sale of war supplies.—Not only was the War Department faced, at the termination of hostilities with a large number of contracts for the production of war supplies, but it found on its hands large stocks of war supplies as a result of these contracts, as well as large reserve stocks which it had been necessary to maintain during the continuance of war and it became necessary to dispose of these surplus stocks of supplies and materials to the best possible advantage and least possible loss to the Government.

Legislation to take care of accumulated war supplies was enacted as early as the summer of 1918. On July 9, 1918, there was approved an act of Congress entitled "An act making appropriations for the support of the Army," which authorized the President, through the head of any executive department to sell upon terms deemed expedient, to any person, group of persons, Government department or any allied Government, any war supplies, material and equipment, by-products, or facilities acquired since April 6, 1917. Sale of guns and ammunition was to be limited to Government Departments, allied Governments and members of the National Rifle Association. A full report of sales activities was required to be presented on the first day of each regular session of Congress, and it was prescribed that the moneys received from such sales were to be deposited to the credit of that appropriation out of which was paid the cost to the Government of the property thus sold, whereupon these funds were immediately to become available for the purposes named in the original appropriation.

War Department Bulletin No. 50, dated August 31, 1918, provided with relation to the operation of this statute, that where the cost price of any such supplies was in excess of \$5,000 the approval of the Director of Purchase, Storage and Traffic was first to be obtained, and after it had been secured the sale was to be at auction or to the highest bidder on sealed proposals, except in the case of sales to a Government department or allied Government, in which case the sale price was not to be less than the invoice price, including cost of inspection and transportation.

Further amplification of sales procedure was made soon after the signing of the armistice, when the great volume of war sales was anticipated. Supply Circulars Nos. 117 and 119, November 21 and 29, 1918, provided that approval of the Director of Purchase, Storage and Traffic should be secured for all sales of \$100,000 instead of \$5,000, and that this approval was required in the case of all proposed sales of buildings, plants, factories, or lands, whatever the cost price of the property. Each supply bureau was required to maintain a division for the handling of the sale of war supplies and to maintain complete lists of such supplies which should be reviewed from time to time in order to report for sale surplus inactive supplies to the Director of Purchase, Storage and Traffic. A full report was required to be made on each sale immediately upon completion.

The problem of the disposal of surplus property sprang to first importance as soon as the armistice was signed, and on December 17, 1918, there was established in the Purchase, Storage and Traffic Division a Sales Branch under the direction of a Director of Sales, and on January 4, 1919, this office was filled by the Assistant Director of Munitions. War Department Bulletin No. 1, January 17, 1919, restated the law and provided that all sales of war supplies should receive the approval of the Director of Sales, and detailed instructions and forms were provided in Supply Circular No. 27, April 8, 1919, which called attention to the provisions of the deficiency act approved February 26, 1919, and added that the proceeds of all sales should be deposited and covered into the Treasury as "miscellaneous receipts on account of proceeds of Government property."

On January 24, 1919, it was found necessary to make an arrangement in regard to sales of supplies on hand as a result of the suspension or reduction of contracts. Supply Circular No. 11, January 24, 1919, permitted the execution of sales incident to the settlement of such contracts without reference to the Director of Sales; however, it was made necessary to secure the approval of the contracting office, board, or higher authority required to approve such contracts of settlements.

In order to assist and advise the Director of Sales in carrying out his functions, there were instituted by Supply Bulletin No. 4, March 7, 1919, a series of special boards. A superior Board of Sales Control was set up in the Sales Branch, consisting of the Director of Sales or his assistant, and the chief sales officer of each sales organization under the various bureaus of the War Department. It was made the duty of this board to serve the Director of Sales in a general way in regard to problems and policies. At the same time there were organized in each of the supply bureaus and departments a Local Board of Sales Control to examine sales within their bureaus to see that such sales conformed with policies and methods established by the Director of Sales.

Special provisions were provided from time to time in regard to the inventory and disposal of office equipment, sales of surplus property intended for export, etc., by Supply Bulletin Nos. 6 and 7, March 17 and 29, and Supply Circular No. 25, April 1, 1919.

Valuation and disposal of real estate.—An account of the organization and work of the Facilities Department of the Purchase, Storage and Traffic Division in connection with the purchase, lease, condemnation, and requisitioning of real estate or buildings and its rela-

tions with the Operations Division of the General Staff have already been described. The work of this department gained added importance with the cessation of hostilities when matters connected with the valuation and disposition of realty acquired in various ways for war purposes came up for settlement. Upon all requests for the purchase, lease, condemnation, or requisitioning of real estate or buildings, except leases of less than \$5,000 per annum, the approval of the Assistant Secretary of War was required. To pass upon real estate transactions, leases, requisitions, condemnations, purchases, and sales involving expenditures up to \$5,000 there was set up within the Facilities Service on January 21, 1919, a Board of Valuation and Review, consisting of three members. The board has been of much value in disposing of a great volume of small cases with which its duties were involved.

On April 1, 1919, by General Orders, No. 43, War Department, April 1, 1919, the Facilities Department of the Purchase, Storage and Traffic Division became the Real Estate Service of the War Department, under the direction and supervision of the Director of Purchase, Storage and Traffic. Its duties and functions were set forth as follows:

(a) The procurement by purchase, lease, rental, condemnation, requisition, or donation of all real estate, or interests therein (including buildings, docks, piers, offices, storage space) * * * required for the use of the War Department.

(b) The granting and renewing of all leases, licenses, permits, or privileges authorizing the use of any real estate, or interests therein, acquired for the use of the War Department.

(c) The sale or other disposition of all real estate, or any interests therein, including the cancelation, extension, or modification of all leases, licenses, permits, and privileges acquired for the use of the War Department.

(d) The establishment and maintenance of a filing and recording system for all grants, deeds, abstracts, leases, and other instruments pertaining to real estate and interests therein, under the control of the War Department, and the maintenance of an indexing and mapping system therefor.

The Real Estate Service is essentially an emergency service to effect the proper settlement of the real estate matters growing out of the war.

Finance.—The processes involved in the consolidation of financial activities continued after the armistice. The transfer of the procurement and storage of Chemical Warfare Service supplies at the various camps and cantonments was by Supply Circular No. 130, December 26, 1918, made to the Office of the Director of Purchase and Storage to be administered under the camp supply officers. In connection with this transfer the work of finance and accounting involved was placed under the direction of the Director of Finance to be performed through the camp finance officers whose creation will be noted below. By Supply Circular No. 2, January 4, 1919, later amended by Supply Circular No. 29, April 8, 1919, the storage and distribution of certain enumerated article of Ordnance material were transferred to the Office of the Director of Purchase and Storage, and

with the transfer went the work of finance and accounting in connection therewith to the Office of the Director of Finance.

On December 2, 1918, the entire functions and activities of subdepot quartermasters at camps and cantonments were transferred to the office of the Director of Purchase and Storage and the subdepot quartermasters became camp supply officers under his jurisdiction. At the same time the work of finance and accounting involved in this readjustment was transferred to the Office of the Director of Finance. It was provided that in each camp or cantonment the Director of Finance should designate a camp finance officer, who, within his camp and under the general supervision of the camp supply officer, should have charge of such finance administration, including disbursements, money accountability, and property accountability as the Director of Finance should direct. By this action the final step in the creation of a finance field force, began by the establishment of zone finance officers, was taken. It has already been noted that provision for the creation of the 13 zone finance officers had been made before the termination of hostilities by Purchase and Storage Notice No. 21, October 28, 1918, but that the system was not actually put into effect until later. The first step was taken toward this consolidation of the field finance activities of the various supply bureaus by the issuance of Finance Circular No. 36 of December 2, 1918, which transferred to the Director of Finance the activities, personnel, and records of finance organizations of the Quartermaster Corps, the Medical Corps, the Signal Corps, and various individual local organizations. Subsequently, by Finance Circular No. 43, December 11, 1918, and later circulars, the consolidation of other finance offices has been continued. Under the system evolved, there are 13 zone finance officers, on technical matters reporting to the Director of Finance, but under the general supervision of the zone supply officers. A close relationship was also required to exist between zone finance officers and camp finance officers, whose duties were more specifically defined by Finance Circular No. 50 of December 16, 1918.

On January 13, 1919, Supply Circular No. 5 reorganized the primary ports of embarkation and debarkation and provided that in addition to his military staff the commanding general should have certain other staff officers, among whom was to be the port finance officer, with responsibility for the payment of officers and troops at the ports, hospitals, and camps, when authorized by the commanding general or by the respective staff officers when authority had been delegated by the commanding general.

It is apparent that the various consolidations of procurement functions with which the consolidation of financial activities went hand in hand necessitated a very close connection between these two services and a clear definition of the complicated processes involved. With these purposes in view, Supply Circular No. 22 was issued on March 14, 1919, on the subject of the coordination of purchases and financial control and set forth a definite course of procedure to cover the procurement of all supplies and services chargeable against funds under the control of the Director of Finance.

Plans for reorganization within the Finance Department had been under way prior to the signing of the armistice. A definite plan was approved on February 24, 1919, by the Director of Purchase, Storage and Traffic. Finally, by Supply Circular No. 30, April 9, 1919,

provision was made for the Finance Service, under the Director of Finance, with responsibility for and authority over all disbursements, fiscal accounting, preparation of estimates and reports of accounts, reporting to and under the supervision of the Director of Purchase, Storage and Traffic.

Calculation of requirements.—The character of calculations of Army requirements changed when war ceased. During the war every effort was bent toward an exact and complete estimation of requirements against the Army program. When the fighting ended there ceased to be an Army program and there is as yet no definite program as the reorganization of the Army upon a peace time basis has not as yet been perfected. When the armistice began, the Army found itself with stocks on hand far in excess of any possible requirements on a normal basis and the problem of requirements control was reduced to the calculation as to how far new requirements would permit of the disposal of these surplus stocks.

Supply Circular No. 70 of July 27, 1918, laid down procedure whereby the total requirements of the supply bureaus of the Army on a war scale might be ascertained on a uniform basis and many of the instructions therein contained became inapplicable or inappropriate when the demand for war supplies ended. The general process, however, remains the same. The Requirements Branch of the Purchase, Storage and Traffic Division receives from the various supply bureaus estimates of their requirements for the year and these requirements are consolidated by the Requirements Branch. The Requirements Branch in turn will keep the various procuring agencies informed as to any changes in the Army program, size of the Army, etc., and in general is charged with the duty of developing a clear understanding of the methods and desired results of requirements computation, to the end that uniform methods and a uniform program may be followed. No change in requirements or methods or bases of computation may be made by the bureaus without instructions from or consultation with the proper division of the General Staff, and any change in any requirements schedule must be immediately reported to the Purchase, Storage and Traffic Division.

Procurement.—The procurement organization of the Army has remained practically unchanged since the armistice. Only two developments need be noticed. One is to the extent to which was extended the process of consolidating the supply organizations of the bureaus into a single purchasing agency for standard supplies, and the other is the alteration to some extent of the procedure of making purchases.

With regard to the consolidation of procurement, it was first intended to transfer all the procurement activities of the Ordnance Department to the office of the Director of Purchase and Storage, and on November 29, 1918, Supply Circular No. 120 was issued which provided for the "transfer of the procurement, storage, and distribution functions of the Ordnance Department;" this order was, however, later revoked by Supply Circular No. 2 of January 4, 1919, which confined the transfer to the storage and distribution functions. Later, however, the procurement of certain enumerated articles of ordnance equipment were transferred by Supply Circular No. 29, of April 8, 1919. No other transfers of purchase organizations have been made. In this connection it may be noticed that the consolida-

tion of storage organizations was carried out to a further extent than was the case in procurement.

During the continuance of the war it had been found advisable to prohibit the publication of certain information valuable to the enemy in regard to War Department contracts. Upon the cessation of hostilities it was possible to revoke these provisions and Supply Circular No. 4, January 11, 1919, provided that contractors were thereafter authorized and permitted to furnish and publish all information concerning War Department contracts and orders received by them. A little later alterations were made in regard to covenants relating to contract brokers and contingent fees in Supply Circulars Nos. 32 and 33, April 29, 1919. On March 14, 1919, Supply Circular No. 22 laid down in detail the procedure which was to be followed in the making of purchases and prescribed the proper coordination which should exist between procurement and financial control.

The Office of the Director of Purchase and Storage having responsibility for and authority over the purchase of the articles which had been assigned to it from time to time and the storage, distribution and issue within the United States of all supplies of the Army, became on May 1, 1919, the Purchase and Storage Service, reporting to and under the supervision of the Director of Purchase, Storage and Traffic.

Engineering and standardization.—One of the lessons learned from the war was that of the impossibility of successful operations without a centralization of supply control. When this had been accomplished it was made possible by planning and engineering to standardize many processes and articles which had been previously designed independently by the various bureaus, making for a great multiplicity of types, confusion on the part of manufacturers and of operating units making requisitions from the field, lack of interchangeability of parts, waste in purchase, increased size of stocks to be kept on hand, and general lack of simplicity in practice.

Advantage was soon taken of the opportunity afforded by the consolidation of procurement to put into effect some of the benefits of these phases of industrial engineering. The Bureau of Industrial Research was organized in the Office of the Director of Purchase, Storage and Traffic, and a group of engineers was associated in the work in an advisory capacity. Later, their activities were more formally organized into an Engineering and Standardization Branch.

During the continuance of the war the activities of the engineering and standardization group were directed to the reduction of packing dimensions in order to save cargo space. It is impossible to list the accomplishments that were made in this direction, but in addition to those given on a former page, a few examples may indicate the great necessity for standardization and what may be achieved under proper circumstances. Recommendations by these experts for the improved crating of a single shipment of 2,000 horse-drawn ambulances was calculated to effect a saving in shipping space of 300,000 cubic feet, roughly equivalent to the carrying capacity of a 5,000-ton cargo boat. In another instance, 50 carloads of freight were so repacked as to require the space of only 15, with proportionate savings in cargo space. It is estimated that all told the packing standardization activities resulted in the conservation of space in

thousands of freight cars and aggregated at least a million ship-tons. Likewise, there was a great reduction in losses due to faulty and defective packing. The money value of savings in packing materials and invaluable tonnage and cargo space amounted to millions of dollars.

Examples of standardizations of articles of supply may also be given. On an order for 300,000 hospital folding cots, through the preparation of comprehensive specifications, a saving was effected amounting to \$230,000, although on account of the urgency 100,000 were placed under the old design and specifications, and the saving applied only to the balance of 200,000. Where but one company was able to turn out cots under the old specifications, several hundred manufacturing concerns were able to turn out cots under the new specifications. In the standardization of tool chests, previously mentioned, the advantages were 50 per cent less cost, more tools, and smaller size. Through standardization, the requirements of the War Department for paints and varnishes were reduced from 250 products in paints and varnishes to 100, and from over 29 shades to 16 shades.

The more recent work of the standardization engineers has been conducted along three distinct lines:

(a) The standardization and research investigation of articles of purchase, including the reduction in numbers, sizes, and types of articles; the reduction in number of shades, colors, and finishes of other articles; the simplification and coordination of specifications of the various bureaus for the same article; supervision of preparation of new specifications where adequate specifications do not exist for any article; and otherwise completing for each commodity a simplified, harmonious, and conservative purchase schedule for the use of all corps and divisions of the War Department.

(b) The supervision of an exhibit of War Department matériel maintained by all bureaus for procurement and educational purposes.

(c) The supervision and study of basic raw materials, strategic raw materials, and substitutes for strategic raw materials.

Storage and distribution.—The principal addition to the storage and distribution service occurring after the armistice was the establishment of the system of camp supply offices, which was authorized by Supply Circular No. 124, December 2, 1918. The existing authority over and responsibility for quartermaster supplies vested in subdepot quartermaster at camps and cantonments was extended to include all Army supplies under the jurisdiction of the Director of Purchase, Storage and Traffic for storage, distribution, and issue, and the designation of these officers was changed to Camp Supply Officer. All of the organizations of the Ordnance Department, Engineer Corps, Medical Department, and Signal Corps at the various camps performing duties involving supply of the Army were consolidated under the camp supply officer. The camp supply officers were required to report to the zone supply officers under whose jurisdiction they operated. Instructions relating to the establishment of the camp, post, and other supply officers and their duties were issued from time to time and were summarized on February 25, 1919, by Supply Bulletin No. 1.

Supply Circular No. 5, January 13, 1919, previously referred to as organizing the staff of the Commanding Generals of the Ports of Em-

barkation, included provision for the Port Storage Officer whose duties included responsibility for and authority over storage and distribution of supplies of all departments, bureaus, corps, or other agencies of the War Department and the operation of all storage facilities. These duties were restated in Supply Circular No. 13, February 19, 1919 to be "the receipt, storage, and distribution of supplies of all departments, etc., and the control and operation of warehouses, and such piers and docks or other facilities as may be designated for the storage or delivery to ships or other carriers of such supplies."

The consolidation of storage and issue begun in the concluding months of the war was continued to the extent of including certain Ordnance and all of Chemical Warfare supplies. The transfer of the storage functions of the Chemical Warfare Service was effected by Supply Circular No. 130, December 26, 1918.

One important matter which required clear definition when the Office of the Director of Purchase and Storage had become fully established was the relative functions and responsibilities of the two main subdivisions of this service, namely, purchase and storage. This differentiation was laid down by the Director of Purchase and Storage in Purchase and Storage Notice No. 57, reprinted in Supply Bulletin No. 30, issued November 13, 1918. This order deals with the subject in detail. In general, the boundary line between the two spheres was placed at the inspection and acceptance of Government property.

The Office of the Director of Storage was equally affected with the Office of the Director of Purchase when on May 1, 1919, the office of their chief, the Director of Purchase and Storage, became the Purchase and Storage Service, reporting to and under the supervision of the Director of Purchase, Storage, and Traffic.

Transportation.—The problems of transportation were not ended by the armistice. The great army of American soldiers which had been safely carried across the ocean during the months of 1918 had to be brought home. Supplies for the troops while they remained abroad had to be transported to Europe and to some extent return cargoes of supplies and equipment no longer needed in France had to be returned. Arrangements had to be made for turning back to their former owners as soon as possible the ships which had been drafted into the service of troop transport and cargo carriage. Pressure on inland traffic was not so great but it was also affected by the process of debarkation and demobilization.

The Transportation Service was established on March 11, 1919, by Supply Circular No. 21, which provided that the Embarkation Service and the Inland Traffic Service should be consolidated into a single operating service which was designated as the Transportation Service. A Chief of Transportation Service was appointed with responsibility for and authority over the transportation of the supplies and personnel of the Army by rail and water.

A field service was provided for the Transportation Service on April 9, 1918, by Supply Circular No. 28. These arrangements were rescinded, however, by Supply Circular No. 41, June 5, 1919, in view of the same subject matter having been covered by General Orders, No. 54, War Department, April 21, 1919. This order provided that

in each territorial department, supply zone, post, camp, or other station, all transportation activities, except those pertaining to the Motor Transport Corps, should be consolidated into a single service, the personnel of the Inland Traffic Service being included in the consolidation at points where they were detailed. The officer in charge of these local transportation sections was designated the transportation officer. At ports of embarkation, transportation officers were also designated.

The organization of the Transportation Service thus became the fourth of the four fundamental services which have developed as the centralized supply system of the Army, reporting to and under the supervision of the Director of Purchase, Storage and Traffic. These services had been performed during the continuance of the war directly within the Purchase, Storage and Traffic Division. The steps by which these services have been discontinued within that division, which has become purely the organization through which is accomplished the coordination and supervision of the supply services on behalf of the General Staff, now forms the concluding section of this account of the Purchase, Storage and Traffic Division.

STEPS TOWARD DISCONTINUANCE OF OPERATING ACTIVITIES WITHIN THE PURCHASE,
STORAGE AND TRAFFIC DIVISION.

The function of the General Staff is to supervise and coordinate the activities of the various arms and services of the Army. When the Purchase, Storage and Traffic Division of the General Staff was organized in the spring of 1918, it was charged with the imperative task of providing a single guiding power to direct the decentralized bureau system of supply then operating under the strain of the emergency. There was immediate need for certain agencies which should perform, under unified control, functions in common for all bureaus. No such common agencies existed and it was necessary for the Purchase, Storage and Traffic Division to build them up within its own structure. Thus the single service for the handling of embarkation, which included the task of transporting troops and a vast volume of supplies, was organized; inland transportation was likewise made into a uniform system; storage and distribution were reorganized under single direction; the procurement of all supplies was regulated by means of a central agency; and finally the fiscal machinery of the Army, the operations of which were closely connected with all other services, was consolidated under unified control.

The establishment of this vitally necessary and previously nonexistent administrative machinery was authorized by legislation. The Overman Act, previously referred to, permitted the President, as he saw fit, to reorganize or consolidate any parts of the machinery of the Government in order to bring about a more perfect harmony of endeavor in the prosecution of the war. This act represented the will of Congress in reply to previous demands within and without that body for greater coordination.

At the conclusion of hostilities, therefore, the Purchase, Storage and Traffic Division consisted of an organization charged with the direction, supervision and coordination of the various requirements, procurement, production, storage, issue, transportation, finance and accounting, and sales activities connected with the supply of the

Army. The Army supply activities under the supervisory and coordinating control of the Director of Purchase, Storage and Traffic were administered and executed by the various operating services within the limits and in the manner prescribed by War Department orders and regulations. In view of the return to peace-time conditions and in order to avoid confusion as to the status of those War Department operating services which had of necessity been developed by the Purchase, Storage and Traffic Division in the absence of any preexistent organizations of the kind, they have received specific designation as services by recent orders which have been mentioned above. At present the operating supply services are the Finance Service, the Purchase and Storage Service, the Transportation Service, and the Real Estate Service. Like all other bureaus and departments of the Army, they report to and are under the supervision of the Assistant Chief of Staff, Director of Purchase, Storage and Traffic, on all matters which relate to the supply of the Army. The Director of Purchase, Storage and Traffic is to all intents and purposes the supervisor of supply of the Army. His office is not an operating service and does not perform operating functions.

PRESENT ORGANIZATION OF THE PURCHASE, STORAGE AND TRAFFIC DIVISION.

With the clear distinction having been made between the operating services of the Army which are subject to the supervision of the Director of Purchase, Storage and Traffic as supervisor of Army Supply and the supervisory functions of his office, the Purchase, Storage and Traffic Division has come to consist of a series of supervisory branches, each charged with the supervision and coordination of the activities connected with one of the major services of the supply system. The framework of the Office of the Director of Purchase, Storage and Traffic, organized on this supervisory basis is, on June 30, 1919, as follows: Office of the Director, Administration Branch, Purchase Branch, Storage and Issue Branch, Real Estate and Finance Branch, Statistics and Requirements Branch, Standardization Branch, Transportation Branch, Sales Branch.

Office of the Director.—The Office of the Director consists of two Assistant Directors, an executive and an assistant executive. Through these assistants close rein is held over the entire operations of the division by means of a grouping of branches for purposes of direction under each, and relation is maintained with the War Department Claims Board which works in close cooperation with the branches of the division.

Administration Branch.—The Administration Branch, in charge of the executive, has charge of the usual routine services incident to the operation of a governmental organization. These include sections in charge of mail and records, orders and regulations, cables and building service. In addition there is an important section on External Relations. Its duties include both domestic and foreign relations. In regard to the former it maintains relations and conducts negotiations with representatives of all other Government agencies and all domestic agencies in matters pertaining to supplies for the Army. It also furnishes liaison officers for the various branches of the division. In regard to foreign relations, it maintains and conducts negotiations with representatives of foreign Governments in matters

pertaining to supplies and supervises and directs the compilation and maintenance of records pertaining thereto.

Purchase Branch.—As stated in Purchase, Storage and Traffic Office Order No. 33, 1919, the duties of this important branch embrace generally the formulation and supervision of the execution of the War Department purchasing policy. In pursuance of this it studies methods of purchase and recommends changes and improvements therein; provides publicity of War Department requirements, contracts and awards; maintains up-to-date lists of all materials purchased by the different bureaus; accomplishes liaison between purchase services and sales branches in the War Department; supervises and coordinates all matters involving patents and rights to inventors, including compensation for the use thereof in the Army, and maintains liaison with the Munitions Patent Board and the patent sections in the various bureaus; supervises and directs the operations of the Board of Appraisers which determines just compensation for all property commandeered or requisitioned, and takes action on all claims against the Government for damages to property of all kinds. By Supply Circulars Nos. 44 and 45 of June 30, 1919, the War Department exhibit of standard equipment and supplies and the preparation of the matériel catalogues which had rested within the jurisdiction of the Engineering and Standardization Branch were transferred to the Purchase Branch.

As at present organized, the Purchase Branch consists of the following sections: Methods Section, Patents Section, Production Section, Inspection Section, Purchase Information Section. The functions of three of these sections have been sufficiently indicated by the above. The Production Section maintains accurate data covering the commodity production possibilities of the country, acts as the consulting production agency of the War Department and, as such, maintains data on the industrial situation of the country as applied to the War Department program and exercises supervision over all production methods in the War Department supply activities. The Inspection Section exercises supervision over all inspection methods in the War Department supply activities.

Storage and Issue Branch.—This branch was established by Purchase, Storage and Traffic Office Order No. 17, February 18, 1919. It supervises and coordinates all activities connected with storage, distribution, and issue of supplies and equipment for the Army; initiates the storage program necessary to the needs of the Army as authorized by Congress; and in general, handles all important matters affecting the administration, supervision, and policy of the Storage and Issue Service. The words "storage and issue" refer to all the activities affecting the supplies of the Army after they have been procured, and the Storage and Issue Branch has to see that all supply departments, including Purchase and Storage, Signal Corps, Ordnance Department, etc., cooperate in their work and that the function of storage and issue coordinates with that of Purchase, Transportation and Finance, and disposition of Government property.

Real Estate and Finance Branch.—On May 15, 1919, Purchase, Storage and Traffic Office Order No. 53 discontinued the Real Estate Branch and Finance Branch as separate branches and consolidated them into a single branch to be known as the Real Estate and Finance

Branch. The duties it carried over from its two former components consist of the supervision and coordination of the operating services conducting the lease, purchase, and disposition of real estate for the Army, and the direction of the activities of the Board of Valuation and Review; the exercise of coordinating and supervisory jurisdiction over the finance and accounting service of the Army.

Statistics and Requirements.—The Statistics and Requirements Branch compiles and maintains statistical records and studies; makes analysis and compilation of requirements of the Army in accordance with the information furnished by the Chief of Staff as to the organization and strength of the military forces and the equipment tables prepared by the Operations Division, General Staff, including compilation of requirements of materials and components which are to be used in the performance of contracts placed by the War Department; and supervises, coordinates and directs these activities in the various requirements branches of bureaus and operating services. In the above connection a study of basic raw materials is being conducted which will be of prime importance in connection with possible further operations in view of the world shortage of such fundamental elements of supply.

Standardization Branch.—This branch was the Engineering and Standardization Branch until June 7, 1919, when its Production and Inspection Sections were transferred to the Purchase Branch and its name was changed to Standardization Branch. With the transfer of these sections went also supervision of the preparation of the exhibit of standard equipment and supplies and supervision of the work of standardization classification and cataloging of material. As at present organized it constitutes mainly a research organization for the study of all problems of standardization in connection with the supply system of the Army.

Transportation Branch.—When the separation of General Staff supervision from the executive and operating services was effected, so far as transportation activities were concerned, by the establishment of the Transportation Service by General Orders, No. 64, War Department, April 21, 1919, provision for superior supervision had already been provided by the creation of the Transportation Branch of the Purchase, Storage and Traffic Division on March 13, 1919. The Transportation Branch prepares plans for the transportation of troops and supplies, upon information furnished by the War Plans and Operations Divisions of the General Staff; studies and passes upon policies in force, and recommends rules, regulations, and legislation affecting the transportation of the Army; coordinates matters of transportation between the various corps, bureaus, and departments of the War Department; takes up with other divisions and branches of the General Staff all matters relating to transportation policies; keeps in close liaison with the Railroad Administration, and the transportation interests throughout the country, and exercises a general supervision of the operation and work of the Transportation Service, in matters of policy.

Sales Branch.—Under date of December 17, 1918, the Sales Branch was established and the Director of Sales was designated. This action was confirmed by Supply Circular No. 16, February 27, 1919. The Sales Branch was charged with responsibility for dis-

posing of surplus property in the United States on terms advantageous to the Government, without competition in sales between various bureaus and without undue interference with existing industry. There was set up, for the purpose of supervising sales, an organization consisting of various commodity sections charged with the furnishing of technical advice with reference to the particular classes of commodities over which each has supervision. A Board of Sales Review, consisting of various members of the sales organization receives technical reports from the various commodity sections and has submitted to it details as to material to be sold which is cleared through this board. Methods of sale, price, and general policies are recommended to the Director of Sales for his approval before the surplus material is placed upon the market, and advice is furnished him on matters pertaining to sales policies. There is also an Administrative Section, a Sales Promotion Section, and a Contract Section.

This entire organization is directory and supervisory, the actual operations of sales being handled through sales boards in the various War Department bureaus having surplus material on hand within their jurisdiction. A member of each of these sales boards, together with the section chiefs and Assistant Directors of Sales of the Sales Branch, constitute a Superior Board of Sales Control, meeting weekly to discuss such problems as may arise with regard to sales within the various bureaus.

VI. MISCELLANEOUS BRANCHES.

THE STATISTICS BRANCH.

During the first eight months of the war, the Army increased in size from 200,000 to 1,000,000. Before the war there had not existed in the department any central statistical office. The department was small enough and the executives sufficiently well acquainted with each other so that it was possible to secure information through personal contact and acquaintance.

With the rapid expansion of the department and the constant creation of new offices, it became impossible for the chief of any service to have intimate personal knowledge of the details of the work under his control.

As this situation developed, small statistical offices began to spring up in the different supply bureaus. The Ordnance Department, the Quartermaster Corps, the Signal Corps, the Engineer Corps, and Medical Corps began to assign officers to the duty of keeping records of contracts placed and deliveries which were beginning to be made. There was not, however, any central office for collecting and coordinating the information from these scattered bureau offices. There was no single office which was able to tell, for example, whether or not a sufficient supply of clothing and of the equipment supplied by the various bureaus was actually on hand to warrant making a draft call.

With the reorganization of the General Staff under General Order No. 14, a central statistical office was established, under the supervision of the executive assistant to the Chief of Staff, charged with the duty of collecting, compiling, and maintaining all statistical infor-

mation relating to the war program, for transmission to the Secretary of War, the Chief of Staff, the War Council, the General Staff, and the several divisions thereof.

The new office came into existence by the transfer from the Council of National Defense of the director of its Statistical Division and 25 of his assistants. This office had been in existence since the beginning of the war, and since August, 1917, had been making weekly reports to the Secretary of War on the progress of military preparations. It had, in addition, compiled a number of special reports on the shipping available for transportation of troops and on the production of aircraft and munitions. By March, 1918, this work had been completely transferred to the War Department and was organized as the Statistics Branch of the General Staff.

The most important work of the Statistics Branch has been the compiling each week of a report consisting of about 50 pages of diagrams and tables setting forth the most important information relating to the progress of the war program and operations. By June 30, 1919, this report had been issued for about 100 consecutive weeks. The object of the report has been to place each week before the Secretary of War, the Chief of Staff, and the heads of the various Army divisions the information necessary for making decisions with regard to military policies.

The branch has done in addition much supplementary work. It has issued each week a condensed report for the President, and each month extensive reports on shipping and on personnel. There have also been prepared about 135 special reports covering a great range of military subjects, an average of more than one special report each week.

By the end of the summer of 1918, the weekly report had increased in scope so that this branch issued not only a regular weekly report but also separate supplementary reports for the chiefs of the supply bureaus and their assistants. A typical weekly report at that time covered more than 1,000 subjects, with an average of about five items of information for each subject. Part of this information came in by letter and telegraph, but the rest of it was secured from more than 100 different offices in Washington located in some 25 buildings.

All this information was checked, verified, and converted into diagrams within a comparatively small number of hours after it was received. The diagrams were reproduced by means of the photostatic process. During the busiest months of the war the output of these sheets of statistical data was in excess of 1,500 each day. The Statistics Branch of the General Staff has made a greater and more varied use of these graphic methods of presenting facts than has ever been made elsewhere by any other organization. Since the inception of the work more than 100 officers have been assigned to the branch. Of these, more than half came from professions, and most of the rest from the statistical and accounting offices of business firms. Only three have been Regular Army officers. Nearly all were young men, and most of them had received thorough technical training in colleges, universities, and graduate schools.

From its inception, the Statistics Branch has been organized as a section of the Office of the Chief of Staff, and has been directly accessible to the Chief of Staff and to the Secretary of War.

By means of weekly lectures, illustrated by wall charts, officers of the branch during the greater part of 1918 furnished the chiefs of supply bureaus, the Maritime Council, the House and Senate Committees on Military Affairs and other important bodies and individuals, information relative to supplies, shipping, movements of troops, etc., which was necessary for those charged with carrying out the Nation's policies and programs.

The branch trained and in March, 1918, sent overseas the nucleus for Gen. Pershing's Statistical Office and in December, 1918, supplied the statistical force for the American Commission to Negotiate Peace.

The existence of cooperating officers in the United States and in France greatly aided in supplying officers in both countries with essential information.

The Statistics Branch has been from the beginning an office for the interpretation and presentation of information. Its work has been to separate the essential information from the incidental and to present it so promptly that it would be immediately available, so accurately that it would be entirely reliable, and so clearly that it could not be misunderstood.

In addition to its regular work of presenting current information, the branch has been able to make a beginning in the development of a science of military statistics. Units of measure have been devised, methods of computation developed, and standards of attainment established for dealing with a large range of military problems.

Methods and data are available for dealing with such matters as the time required to raise and train different sorts of troops; the proportion of men fit for military service; the time required for the procurement of different sorts of munitions; the carrying capacities of ships in terms of men, animals, motor transport, and supplies; how fast clothing wears out; storage space required; the analysis of the data of battle costs and accomplishments; and so on over a great range of subjects.

The lessons of the war indicate that the work of the Statistics Branch must not be suspended, but that as an aid to efficiency in peace and a means of preparedness for war, it will be necessary to provide for a permanent central office of military statistics within the organization of the General Staff, which will maintain the contacts with the great numbers of sources of military information now established by the Statistics Branch and which will keep up to date the valuable and comprehensive data collected by this branch since its organization.

THE MORALE BRANCH.

In the conduct of the war all the belligerents have given attention to and recognized the importance of the mental forces in armies.

The extent to which the Central Powers relied upon the depression of the morale of the military forces and the civil populations of their opponents, particularly in the Russian and Italian campaigns, was generally known, as was also the wide use by all the armies of propaganda calculated to lower the morale of their opponents.

Just as the industrial strength of the country had to be directed into war ends, so was there necessity also for using the tremendous

war determination of the American people to constitute that mental force in armies which Napoleon declared "is to the material as three is to one." While the German armies had for some time maintained a so-called "educational service," the American Army was the first to establish an organization which would facilitate the adjustment of the recruit to the military environment and systematically survey conditions effecting a state of mind so as to advise commanding officers how best to preserve contentment and high morale. The organization of this work, which finally culminated in the creation, in October, 1918, of the Morale Branch of the General Staff, which, under the supervision of the executive assistant to the Chief of Staff, was charged with the improvement of the efficiency of the soldier through the betterment of morale, was the natural outcome of the auxiliary morale work carried on by the various welfare organizations, in which the United States was also a pioneer. Their work, however, bore only an indirect relation to military efficiency, and in the light of European experience, it was realized that maintenance of military morale was strictly a problem for solution by the Army itself. This conviction was also strengthened by the experience in developing the fighting spirit through the training period when many diverse morale measures, later standardized, were first given practical effect by individual commanders.

The sudden cessation of hostilities gave but little opportunity for the Morale Branch to function under war conditions, but the successful administration of morale work in a limited field conducted by the Military Intelligence Division and in certain camps had demonstrated its military value.

It has been in the readjustment period of demobilization that morale work has had its greatest practical application, and it is believed that it has played its fair part in allaying many of the cases of discontent and difficulties which are usual upon demobilization of large armies.

In the present, as in the past, the commanding officer is the real morale officer. It has been found, however, that with the manifold duties devolving upon him, and in view of the many factors bearing upon morale which are too numerous to reach the individual attention of the commanding officer, he must depend to a large degree upon an officer who will specialize in the subject.

It is the function of the Morale Branch, General Staff, to make a coordinated study of the entire subject of morale and to furnish the service with ideas which, in practical experience, have been found to be of value in maintaining the desired discipline and spirit.

It is believed that the experience and collective knowledge of the older officers in the successful handling of men are based on general principles capable of wide application, and, if collated, will undoubtedly be of assistance to younger officers of the Army. Such collation is now in preparation for eventual dissemination to the service.

Concerned originally with effective stimulation of fighting troops, and later with the maintenance of morale during the process of demobilization, morale work has now entered upon a third phase, that of application to the Regular Establishment.

Its organization has, therefore, been extended by the appointment of morale officers upon the staffs of all department commanders and

the directed establishment of morale organizations at all organized divisions, posts, camps, and stations, or points of activities of staff departments, where appreciable numbers of officers and enlisted men or civilian employees are stationed.

The Morale Branch has made extensive use of publicity facilities of the service. News, editorials, and cartoon matter bearing upon morale has been regularly furnished the various camp and service papers. Also, at the suggestion of the Morale Branch, there have been organized publications in the majority of the base hospitals, which reached, in several instances, circulations of from 50,000 to 75,000 copies each week. The motion-picture field was not neglected, and, in addition to the insertion of morale points in regular releases, special animated cartoons dealing with particular problems were prepared and routed through the camps. Because of the value of pictorial representation of ideas a service series of morale posters was instituted which has had the advantage of appealing to many whose education prevented consideration of reading matter.

Lectures also have been utilized to a large degree, particularly in connection with morale units placed on homeward-bound transports to make use of the predischARGE period for intensive inculcation of ideas of good citizenship, maintenance of soldierly conduct while wearing the uniform, what would be expected of the returned soldier, reentrance into civilian employment, etc.

As one of the most effective means of allaying unrest while awaiting discharge, educational courses were originated and carried on as morale measures. In spite of the fact that the courses on educational and vocational subjects have been optional, attendance and interest have been so conspicuously general as to indicate wide demand for such systematized training and to fully justify any effort expended on its continued use and expansion. As morale agencies, and irrespective of their other benefits, such courses have proved of great value and there was no question as to the welcome given them by the men. While exact figures can not be given for the total of men enrolling for these courses throughout the service, because of the changes of demobilization, in the educational courses at one camp 4,362 men were enrolled at one time, and at another approximately 4,000 men were engaged in a practical course in farming. The attendance at other camps has been correspondingly large.

While all the facilities of the welfare organizations have been utilized in so far as they touch upon morale, the real basis for the work rests upon a military foundation, and so morale officers in touch with individual problems have been chiefly used as morale agencies.

All important information secured through investigation or new practical ideas tried out by individual officers are incorporated in circulars and thus disseminated throughout the entire field organization.

In addition to their particular duties, morale officers have frequently been of assistance in recruiting and Liberty loan campaigns, and in furthering the efforts of war-risk insurance and agricultural representatives and agencies engaged in providing employment for soldiers on discharge.

The experience of the war has demonstrated the desirability of maintaining, as a part of the permanent organization of the Army, a centralized supervision of morale matters.

VII. DEMOBILIZATION.

SITUATION ON NOVEMBER 11, 1918.

The signing of the armistice on November 11, 1918, marked the completion of the military victory of the allied forces and caused an abrupt cessation of active hostilities. The object of all military endeavor had been attained and scarcely an activity or an individual was not affected by the great transition from war to peace conditions. For the General Staff in this country its duties and responsibilities connected with the work of mobilizing, training, equipping, and transporting soldiers to the theater of operation and there maintaining them, were brought to a sudden end and new and entirely different questions arose.

All belligerent countries were faced with the necessity of reducing their armed forces to an extent compatible with safety under the changed conditions. In the case of the United States problems confronting the General Staff were complicated and made unusually difficult of solution by the fact that its forces were in a land separated from the home country by the breadth of the Atlantic Ocean. The task of demobilization in numbers of men alone was tremendous—a fact which is well illustrated by the following table which shows the strength of the emergency Army as of November 11, 1918:

	Officers.	Men.	Total.
U. S. Army in Europe.....	80,842	1,858,474	1,949,316
Marines with Army in Europe.....	1,002	31,383	32,385
Total American Expeditionary Forces.....	81,844	1,899,857	1,981,701
At sea, en route to Europe.....	1,162	21,072	22,234
Total American Expeditionary Forces and at sea.....	83,006	1,920,929	2,003,935
In United States.....	104,155	1,530,344	1,634,499
Total in United States, American Expeditionary Forces and at sea.....	187,161	3,451,273	3,638,434
In insular possessions, Alaska, etc.....	1,977	53,758	55,735
In Siberian expedition.....	298	8,806	9,104
Total U. S. Army.....	189,436	3,513,837	3,703,273

It was obvious that the country should be expeditiously relieved of the expense of supporting these forces and that the men themselves should be speedily returned to their families and to their normal places in the social and industrial life of the Nation, as expeditiously as the changed military situation permitted. Many limiting factors and conditions were, however, in existence. The fact that 2,000,000 men were to be brought back from France in itself showed at once that demobilization could not be effected within a period of weeks. Moreover, the signing of the armistice did not put an end to the war—it was merely a cessation of active hostilities during the time that negotiations were being discussed. The emergency still existed and would continue to exist until the preparation, signing, and final

ratification of a treaty of peace should have been accomplished. It was always possible that the enemy might violate the armistice terms or refuse to sign the peace treaty. To guard against further attack and to have at hand the means to resume hostilities, should such a course become necessary, it was essential that an allied army of occupation be maintained until the termination of the armistice and probably longer. However, by the crushing military defeat administered to her, and by the terms of the armistice, the forces of Germany had been so weakened that it was evident that the nations opposed to her could materially reduce their vast military establishments.

After 19 months of concentration of all national activities to the one end of the production and upbuilding and maintenance of an effective war-making machine, the solution of the problems of readjustment were not to be lightly undertaken. The welfare of the Army and of the country demanded that definite provisions should be made for the wise redistribution of the men to be returned to civil life and that there be effected the best possible disposition of the property and material which had been accumulated. Economic and industrial considerations demanded assurance of the orderly disbandment of soldiers with the minimum of disturbance to the business world already engaged in the complicated and delicate task of industrial and economic reorganization. This problem involved such considerations as coordination with the labor and employment situation; measures to prevent congestion of unemployed ex-soldiers in the larger cities; the securing of positions for discharged men; the disposal of surplus stocks of supplies and material and the termination of contracts with due regard for the interests of industry and the interests of the Government.

As may be seen from the table given, there were in the United States itself over a million and a half men comprising organizations which had never left this country. The great majority of these could be disbanded. It was, of course, necessary to make provisions for the reception and disposition of men and equipment from abroad. All these considerations made it of utmost importance that the Army should develop as soon as possible a comprehensive demobilization policy, based not only upon its own interests, but upon those of the country at large.

DEMOBILIZATION IN OTHER WARS AND IN OTHER COUNTRIES.

There were few precedents afforded by the experience of former wars which were of value in making up such a policy. The soldiers demobilized after the Revolutionary, Mexican, and Civil Wars were afforded boundless opportunities for occupation by the possibilities inherent in economic and territorial expansion of the country. The War with Spain had made necessary the expansion of the Army to only 280,500 and the demobilization of the men rendered surplus upon the return to peace strength did not involve economic problems of great magnitude.

A study of European wars showed that the Franco-Prussian War, finally brought to a close by the treaty of Frankfort, signed May 20, 1871, did not present problems of demobilization closely analogous to those confronting the United States in November, 1918. The

French forces in 1871 were destroyed by being outmaneuvered and outnumbered. The resources of neither nation were exhausted and the French were defeated by military means. Both France and Germany were agricultural countries and, in the absence of an economic or industrial crisis, both countries readily absorbed their discharged men.

The Russo-Japanese War was also not an economic war. At its close Russia had to demobilize a surplus of 323,000 men and the distribution of this small number among a population of 143,000,000 did not cause great economic difficulty. Japan discharged approximately 568,000 men who returned to civil life in a population of about 47,000,000. The records of the demobilization of this army are meager and afford a possibility of only limited study. Owing to the fact that Japan was then essentially an agricultural country, however, it seems unlikely that the return of these soldiers caused serious difficulties.

At the close of the Boer War, the forces opposed to Great Britain numbered only about 20,600 men, who were gradually returned to their homes. The men of the British expeditionary army at the close of the war went home to find that England, deep in labor problems, was experiencing one of the most critical problems of unemployment.

At the close of the war, Germany was in disintegration, demoralization, and social upheaval. The terms of the armistice provided that German forces should withdraw behind the Rhine within 25 days and that demobilization should then begin. With military authority practically nonexistent, however, formal demobilization of the disorganized German forces could not be carried out and the Ebert government was finally forced to beg the soldiers to go home and demobilize themselves in as orderly a manner as possible.

In France, a country which for years had had universal military service, demobilization meant a return from service with the colors to the reserves. All men were already arranged in classes according to the year in which they had originally been called to the service. In demobilization, the orders provided that the classes of 1887, 1888, and 1889 be the first to pass back into the reserves, and provided a regular schedule for demobilization of other classes which it was no longer necessary to retain in active service.

A somewhat similar plan was followed in Italy, where like conditions prevailed. In March all the class of 1885, with the exception of automobilists, were to be discharged; the class of 1886 followed toward the end of the month. Each month thereafter two classes were to be discharged until the process should be complete for all men no longer needed.

The case of Great Britain presented the nearest analogy to that of the United States. Long before November, 1918, the Minister of Reconstruction and an advisory department had made a survey and drawn up plans to place properly in their proper occupations the millions of returning soldiers. It had been estimated that some 60 per cent of England's soldiers had positions awaiting them, and an elaborate system was built up for the purpose of bringing together the man and the employer. The scheme, however, was complicated by the fact that great amounts of raw material were needed, and

that replenishment of such basic stuffs required ships for its transportation from the other countries; to return the Army also required ships. Effort was therefore made to coordinate demobilization with the economic conditions at home, and the general plan which it was proposed be followed was roughly that when employment should be awaiting the individual soldier, and when there should be sufficient material for him to work with, then that soldier should be discharged.

To carry out such a plan required a most intricate and complex system. There were some workmen who not only had positions awaiting them but on whose labor production depended. In systematizing the scheme prior to the armistice, cards had been issued to each soldier, on which he was required to give data concerning his previous occupation and as to whether a position awaited him. Means were necessary to verify these statements made by the men. Employers also were asked to submit cards giving the names of those soldiers whose services they particularly desired. In this way it was attempted to bring together the man and the employer. The limitation regarding the availability of material which the man would need in order to perform his labor introduced a difficult factor and made necessary a most elaborate and peculiar system of demobilization according to industries. The outstanding feature of the final British policy was its subordination of the military to civilian interests. The release of men was to depend on the ability of the individual to obtain employment and on the value assigned each particular industry as contributing to general national welfare. This elaborate scheme, worked out in advance of the end of the war, had been given great publicity. The actual operation of the British plan has been severely criticized. Many men who felt that they should be given speedy discharge claimed that they had been unjustly discriminated against. The cry of the Army for immediate return home was loud and insistent. In practice this system of England's was largely modified as a result of the demand of the people that many of its tentative arrangements be made more simple. However, when the adoption of a method of demobilization for the United States Army was being considered the elaborate system of England was at the very beginning of its operation and put directly before this country an example of an "industrial demobilization."

DEMobilIZATION IN THIS COUNTRY.

The choice of issue.—Formulation of a demobilization policy for the United States Army had been begun by the General Staff about the middle of October, 1918. It was soon perceived that there was definitely presented a choice between some form of demobilization by occupation, the plan adopted by Great Britain, and demobilization by military units. In short the question was, should the United States discharge men according to occupational classes and make the order of discharge dependent on the availability of employment, or should the plan be adopted to disband complete military organizations in the order of their availability for discharge? Most careful consideration was given the issue involved in both systems before final decision.

Demobilization by occupation would have disrupted military units necessary for the proper supply and maintenance of the Army overseas and would have seriously impaired the efficiency of those organizations whose retention in the Army was necessary. Since it would require an entire regrouping of all men in the service this plan would have been slower of operation and much more costly than would be demobilization by military units. Moreover the military situation overseas would not have permitted the return from France of men grouped according to occupations.

The plan making the order of discharge dependent upon the availability of industrial positions to which the individual might return on submitting a request stating that employment awaited him, was also considered and deemed impracticable. Had the War Department announced such a system of discharge on individual application, practically every man in the Army would at once have submitted his request for immediate discharge. As it would not have been possible to discharge immediately all who applied for such discharge, the different applications would have required careful study to determine which was the most deserving and who should be discharged first. This comparing of the relative merits of individuals for discharge would have involved an almost inconceivable amount of work and would have very greatly retarded the progress of demobilization. To try to decide the priority for discharge of individuals in an army of nearly 4,000,000 soldiers would have created infinitely more dissatisfaction among the soldiers, who were not selected for early discharge, than the method used of discharging first all men in units that could be spared.

Under the plan adopted hundreds of thousands of men were soon returned to their families, home communities, and industrial centers, who might not have been released for months if the War Department had attempted to inaugurate a scheme of demobilization based largely on individual requests for discharge.

As a result of this plan for demobilization by military units, to the end of the fiscal year 2,608,218 enlisted men and 128,436 officers were discharged from our temporary forces, and have assisted in the revitalization of industrial life and in expediting the return of the country to normal peace-time conditions.

Further provisions of the plan adopted were for a classification of all military units as surplus, or as essential for temporary needs, and for the arrangement of a priority schedule for demobilization by which the least necessary units should be disbanded in the order in which they became surplus, leaving the remainder of the forces entirely intact. Industrial and employment considerations, problems which were rendered much easier of solution by the fact that each division contained within itself industrial strata of many different occupations, were met as fully as was possible within the unit system. The main features of the policy were that it secured an orderly return of the troops, that priority schedules within the military system maintained the Army as an efficient machine, and that sufficient elasticity of operation was furnished for special and individual cases.

In general the principles on which the policy of demobilization by military units was carried out were that no one should be discharged at any place other than at the camp nearest to his home, that no

one should be discharged while there remained a possibility of improving his physical condition, that the ex-soldier's prospects as a civilian should be furthered as much as possible, that each officer should be given an opportunity to qualify for a commission in the Reserve Corps, that everything should be done to encourage officers and enlisted men to go directly to their homes, and that the processes of demobilization should be as rapid as possible.

Early steps.—The choice of policy having been made, the next considerations were the determination and establishment of methods to be adopted in order to carry it out. These decisions and the close supervision and coordination of the actual work of the machinery created direct responsibilities for the Operations Division. The first steps in actual demobilization were taken while the policy itself was being formulated and consisted in those measures which became obviously necessary as soon as active hostilities were brought to a close. At this time movements of drafted men were then contemplated which would have added greatly to the strength of the Army. On the morning of November 11, immediate discontinuance of all mobilization was directed and subsequent orders to the Provost Marshal General canceled all draft calls pending developments. Registrants were notified that they reverted to the status they had had before receiving their calls. All such men who had reported were discharged from the Army.

It was found that there were certain pressing needs which for the good of the country, and in order to expedite demobilization, necessitated the discharge at an early date of certain industrial workers. The only three classes of occupations included were anthracite coal miners, whose services were needed to avert a threatened shortage which might have caused great suffering to the civil population during the winter; railroad employees needed to relieve the anticipated strain on the railroads who would be called upon to transport the hundreds of thousands of men to be discharged, and finally railway mail clerks whose services were badly needed.

When the scheme for demobilization was put into effect, it was realized that there would arise in units whose demobilization had not been ordered certain cases which would deserve individual attention. To this end, therefore, Circular 77, War Department, 1918, was issued about 10 days after the signing of the armistice. This circular provided for the discharge of men who entered the service for the period of the emergency, in whose families there was need or distress, or whose services were urgently needed by some business or industry, provided they were eligible for discharge and could be spared or replaced. To prevent such cases from being arbitrarily decided by subordinate commanders, with possible injustice to the enlisted men concerned, provision was later made for the ruling on all such cases by department or camp commanders, prior to final decision.

While it was not at first to the best interests of demobilization to attempt to discharge a comparatively small number of individuals on their pleas for individual discharge, the War Department was on the alert to modify its instructions the first moment possible, where changing conditions would justify modifications of policy. As the large units in this country whose discharge en bloc could be ordered were demobilized, the time arrived when it was possible to issue

instructions the effect of which was to release men to a larger extent than formerly on their individual application for discharge in cases where definite employment awaited them and it was to the general interest of the country that they should be released. On the other hand, provision was made for retaining in service those soldiers who had no prospect of immediate employment, and Circular 34, War Department, 1919, provided that commanding officers should take steps to insure that every enlisted man in their command understood thoroughly that the War Department did not desire to discharge any soldier who could not secure civilian employment, and that in place of being discharged as he would be normally under orders for demobilization, he might remain in the military service until such time as he could secure employment.

About November 16 instructions were issued specifying in general the order in which various types of organizations should be demobilized. The first were the 71 development battalions in the United States, which embraced a total of 98,199 men. There was also directed the discharge of such conscientious objectors as were not undergoing punishment for mutiny, sedition, disobedience of orders, disloyalty, or other military offenses. There was no further need for continuing in existence the Spruce Production Division, which was engaged in furnishing the raw material for all wooden parts used in the manufacture of aircraft for our own Army and for the armies of our Allies, and in consequence the order for the discharge of the approximately 30,000 men included in its organization was early issued. Provision was made that no more candidates should be admitted to training schools (candidates that so desired were allowed to complete their courses in order that they might qualify for commissions in the Reserve Corps): this, coupled with the suspension of the appointment of more officers, put an effective stop to mobilization of commissioned personnel. It was also directed that the United States Guards, a force of some 30,000 men, be discharged as soon as their services could be spared. The orders further provided that the balance of the Army should be demobilized in the order of railroad troops, depot brigades, replacement camps, and, finally, the combat divisions.

The commanding general of the Expeditionary Forces was directed to designate units to return from over seas as soon as they were no longer needed and transportation could be secured. The War Department recognized that some method must be provided for securing discharge in exceptional circumstances arising in the units overseas as well as in the cases of men in the United States, and therefore authorized Gen. Pershing to send to the United States, for the purpose of immediate discharge, individual men and officers on presentation of convincing testimony to the effect that sickness or other distress existed in their families. Furthermore, he was empowered to discharge in Europe any officer or enlisted man who had entered the service, in Europe, since April 1, 1917, and who submitted sufficient reasons for requesting such discharge.

Demobilization Centers.—In forming the plan for the disbandment of the greater part of the Army, the question of next importance after deciding priority of demobilization and providing for exceptional cases, was by what method and with what machinery

the return of soldiers to civil life could be effected in the most practicable, economical, and expeditious manner.

The system adopted was to establish "demobilization detachments" at certain camps and cantonments throughout the country which were designated as centers for the demobilization of men already stationed at those camps, and to which could be sent men received for discharge from the forces overseas. These organizations were composed of skilled personnel temporarily retained in the service for the operation of the machinery of discharge. This detachment conducted the physical examinations, made up the necessary papers to close all records, checked up property, adjusted financial and other accounts, and, in general, attended to all the many details involved in the process of discharge. Soldiers arriving from overseas were sent for discharge to the demobilization center nearest to their homes.

The process of discharging men from the service was by no means a simple procedure. In order finally to establish the final status of the discharged soldier and to settle his accounts with justice to the individual and to the Government, complete papers and records of various kinds had to be carefully made out in detail. Many men, in their desire to be released from their obligation of service, attempted to conceal physical ailments which, in justice to them and their families, should receive the attention of the Army medical authorities. It was also foreseen that in order to protect the Government from future fraudulent claims for pensions based on disability alleged to have been incurred in the service of the Government, a most thorough physical examination should be given every individual officer and enlisted man. These examinations were conducted at demobilization centers by boards of officers of the Medical Department, each board including in its membership experts in the various medical specialties. At these examinations every defect of any nature found by the examining boards was noted on the individual's record. As a result, these records will always be available for reference and will enable the deciding authority to adjudicate with justice to all concerned. The soldier's pay and allowances due him upon discharge and his final accounts were also computed and paid. This work had to be done carefully and accurately in order to obviate the possibility of working injustice or giving a foundation for future claims. Rights under the war-risk insurance were carefully determined and explained, and where necessary, adjustments were made. On the average, about eight days were consumed from the time of the arrival of the individual man at a port in this country to his arrival at the demobilization center nearest to his home. Men coming to the centers in smaller groups were discharged in an average of 48 hours, whereas for those returning as members of a combat division, this period was sometimes extended a few days.

All of this, of course, required much paper work which could only be properly done by skillful personnel trained in Army procedure. It was at one time proposed that the local draft boards should be used to perform these duties. Had this system been approved, it would have been necessary to provide each one of the 4,648 local boards with the commissioned and enlisted personnel required for the preparation of all papers and with facilities for the

reception, storage, and care of all Government equipment turned in, as well as for the physical examination of the soldiers, the housing and messing, the furnishing of medical attendance and hospital treatment, while the officers and men were awaiting discharge. A further consideration was that shipments from France could not be so regulated as to distribute soldiers for discharge equally over the United States; in consequence, the personnel of draft boards would have been practically idle for long periods of time and overwhelmed with work at other periods.

To meet these problems there was therefore adopted the scheme already described of discharging men at the demobilization centers nearest their point of entry into the service. This resulted in the entire process being conducted through 30 large and well-trained centers which accomplished the work most economically, rapidly, and efficiently.

It was early recognized that a great railroad problem was involved in the transporting of soldiers from Atlantic ports to demobilization centers, and from these centers to their homes. This problem was most satisfactorily solved by the Railroad Administration, which, in addition to efficiently handling the enormously increased travel, also reduced from 3 to 2 cents a mile the fare charged a soldier returning home.

The case of the individual enlisted man.—The system formulated at once after the conclusion of hostilities worked out in the most satisfactory manner. The policy of demobilization by units avoided disrupting the Army as a whole and resulted in returning men to civil life gradually.

The phenomenon of persons crowding into the large cities has occurred in every country that was in the war. There has always been a pronounced tendency for returning soldiers to flock to the cities. Men from farms and rural communities, taken from their homes and shown something of the world, desire to go to the large cities to seek the excitement to be found there. This is a trait of human nature which could not be overcome by legislation or War Department regulations. For a time there was anxiety in many communities lest the soldiers, suddenly released from the restrictions of discipline, might commit excesses. The attitude of the War Department was that those who had been in the service were, as a rule, better men physically, mentally, and morally than they were when they entered the service. It was further maintained that soldiers who can be depended upon to defend their country with their lives should be treated as men worthy to be trusted. The endeavor was therefore made to accomplish the desired result without infringing upon the unquestioned rights of the discharged soldier.

In forming plans for demobilization, the General Staff gave serious consideration to this question. Under existing law, a discharged soldier can not be given transportation in kind but must be paid a travel allowance from the place of discharge to the place of entering the service. In order to encourage the soldier to return to the home community upon his discharge, provisions were made so that the men on receiving their final pay and travel allowances were marched directly to the place where railroad tickets to their homes were obtained. It was further provided that all personnel, morale, and other

officers should cooperate to impress on the men the importance of immediately purchasing railroad transportation, rather than run the risk of losing or squandering their money and thus become a burden upon some near-by community.

The discharged soldier left the Army with his pay plus a \$60 bonus. In health he was in general at least as good as when he entered the service; if wounded or in worse health, he was entitled to compensation. As has already been said no officer or enlisted man was discharged, even on his own desire, until he had received the full benefit of Army medical treatment. Every man was also given a uniform, shoes, and an overcoat or a rain coat. In the case of overseas men, helmets and gas masks were issued as souvenirs. All men who had been fit to take our war-risk insurance were informed of the right to convert it to a five-year term insurance. Furthermore, all were furnished with records of their service. In certain cases, direct vocational training had been given to the men; and in all cases every possible effort was made by the War Department to obtain employment in civil life for ex-soldiers. This latter phase was handled by cooperation with and through the office of a special assistant to the Secretary of War, appointed for this sole purpose.

The accomplishment of these tasks could only be achieved through the cooperation of all branches of the Army. Within the General Staff, the Operations Division (especially the Operations Branch), and the Purchase, Storage and Traffic Division were the ones most occupied in these matters. The Adjutant General was concerned with the proper compilation of the records of the individuals; the Medical Department with the examination of men to be discharged and the care of the great number of wounded, sick, and convalescent soldiers. In addition, every bureau of the War Department was of course also affected and concerned.

The case of the individual officer.—Steps were early taken to secure from all emergency officers a statement as to their own preferences; that is to say, whether they wished immediate discharge, or to be retained in the service with the possible view of their being commissioned in the Regular Army, or if they wished to accept commissions in an enlarged Officers' Reserve Corps. These measures were taken, of course, not only to learn the desires of the temporary officers, but in order that the country should not lose the services of the large reservoir of trained commissioned personnel which they represented.

In general, demobilization of officers proceeded simultaneously with that of the troops, relative proportion being maintained. The methods of payment of officers, the compilation of their records, medical examination, etc., were practically identical with those provided for the enlisted men, except that the officer, should he so desire, had the opportunity to retain, or better, his rank in the Officers' Reserve Corps provided his services had been satisfactory. All officers who had expressed the wish to become a part of the Regular Army, or of the Officers' Reserve Corps, underwent examination to determine their fitness for such commissions.

Until legislation is had defining the future military policy of the country, and fixing the strength of the permanent military establishment, it will, however, be impossible to act finally upon such applications.

Temporary retention of personnel.—In the general eagerness to have immediately discharged the soldiers who had enlisted or been drafted for the emergency, there was a tendency to overlook the fact that after the signing of the armistice there remained much important work for which it was absolutely necessary to compel the retention of some officers and enlisted men until others could be obtained to replace them. There had to be maintained efficient and trained forces to man the ports of debarkation, the convalescent and demobilization centers, the supply depots, the base and general hospitals, and the garrisons along the Mexican border and in our insular possessions, as well as to provide personnel for tasks incident to the transportation and distribution of men and supplies. There were certain soldiers whose services could not be spared; for them the emergency was not over, and loyal and self-sacrificing services were required of them.

It was further necessary, in order to effect the discharge of officers and enlisted men to retain for a time the services of a number of emergency officers. Moreover, the work of the bureaus in disposing of surplus property, closing accounts, etc., also required the temporary retention of many officers. To have discharged these officers, then trained in their own particular duties, would have resulted in the loss of great sums of money and in long delay in disposing of property. Certain branches of the General Staff, such as the Military Intelligence Division, and certain new services, such as the Tank Corps, Chemical Warfare Service, Air Service, etc., were almost wholly composed in their commissioned grades, of officers who had come into the service for the emergency and who could not be at once discharged.

In addition, the work of the Medical Department, of course, did not cease, nor for a long time decrease in volume; there was great need for doctors, the great majority of whom were emergency or temporary officers. It was frequently asked why units of the Regular Army were not assigned such tasks. The explanation lies in the facts that organizations of the Regular Army at the time of the armistice were composed largely of selective service men and those voluntarily enlisted for the period of the emergency; that the original permanent Military Establishment was thinly spread throughout all forces in this country, in Hawaii, Alaska, the Philippines, China, Russia, and in France; and that a majority of the enlisted men of the original Regular Army besides forming a leaven for the entire emergency Army were largely concentrated in the first to eighth Regular Army Divisions, the last to leave France. It is doubtful, moreover, if in the entire Army, 50,000 of the original Regular Army enlisted men remained.

In order not to retain any man in service unless he was indispensable and could in no way be replaced, the hiring of civilians was authorized for such work as they could properly perform. Orders were issued to all commanders to accomplish with the least possible numbers the work which could be done only by soldiers. The War Department on different occasions after the signing of the armistice urged the importance of legislation authorizing the resumption of voluntary enlistments. Finally the act of February 28, 1919, was passed by Congress, and there is now in process an energetic re-

cruiting campaign in which all means at the disposal of the War Department have been used to obtain recruits. Up to June 30, 1919, approximately 67,000 men were secured.

Convalescent centers.—Throughout the entire process of demobilization of men whose services were no longer required, every effort has been made to return the soldier to civil life in a physical condition as good as, or better than, that in which he entered the service. To carry out this policy, every man suffering from wounds, sickness, or physical ailments was not discharged until he had been cured, or until a point of maximum possible improvement had been reached.

The machinery provided for this purpose was the establishment of convalescent centers at the various cantonments. There men whose condition no longer required that they receive hospital treatment were assembled, and under the close supervision of officers of the Medical Department, were given training in various trades, exercises suited for the needs of the individual case, drill, recreation, etc. Convalescent centers have been instrumental in the physical reconstruction of thousands of men. As soon as it was deemed that no further improvement could be made in the physical condition of any man, he was given his discharge and returned to his home. In all convalescent centers, demobilization centers, hospitals, camps, depots, and stations literature concerning the provisions the Government had made for men who had been incapacitated in the service was distributed. All men were fully informed of their rights to compensation and insurance under the war risk insurance act, and to training and the securing of employment under the vocational rehabilitation act.

Demobilization of troops from overseas.—The men of all organizations whose services were no longer required in France could not have been demobilized any faster than they were, since they were brought home as quickly as it was possible to secure shipping for them. The speed with which these forces were returned to the home country is indeed remarkable when it is remembered that it required more than a year and a half to transport these 2,000,000 men and their supplies to France, using all of the ocean tonnage that could be spared from the world's needs. Practically one-half of our troops had been sent abroad in British transports. Since these ships were employed after the armistice in returning British colonial troops to their homes and in readjusting the world's supply of food, they were no longer available for the United States.

At this time the total troop capacity of American transports under the control of the United States was approximately 110,000 men per month. Instructions were therefore given that steps be taken to increase immediately the American transport fleet. How successful were the efforts to accomplish this can best be shown by stating that the troop vessels operating in the service of returning the American forces from overseas debarked 333,333 men in May of 1919, and 342,816 men in June. The increase in the number of ships which made possible the achievements of these two typical months, was brought about in several ways. Some 58 cargo transports were altered and converted into troop ships; the Navy assigned some battle-ships and cruisers to augment the transport service; 10 large passen-

ger ships originally belonging to the German Empire were obtained and promptly equipped for carrying American troops. In addition, the War Department was successful in negotiating with the Italian, French, Spanish, and Dutch Governments for the utilization of suitable passenger vessels of their fleets. There has been no problem before the War Department that has received more prompt attention than the return of the American forces from France. Every effort was made to expedite the fitting out, repair, and "turn around" of troop transports. A number of the faster vessels in the transport fleet have been able to land their cargo of American troops twice during the same month.

It is estimated that as the result of the steps outlined above to expedite in every possible way the return, and hence the demobilization, of our overseas forces, a saving was made of approximately \$60,000,000 to the Government over the original estimate made as to the cost of the demobilization.

Parades.—In routing organizations from the ports of embarkation to demobilization centers, every reasonable effort was made to permit the maximum number of people possible to extend to the returning organizations the welcomes to which they were entitled. In order to permit units not larger than a regiment to stop at important cities en route to demobilization centers, the following general principles were early approved: (a) That every effort should be made to permit troops coming from a particular city to hold parades in that city; (b) that as many cities as possible should be permitted to have troops stop off for parade purposes; (c) that the schedules should be arranged to insure a fair distribution of troops.

The War Department being in possession of information showing the localities from which all troops came, the Operations Branch of the Operations Division was enabled to make an assignment of troops to their own localities. Practically every request, except for some parades of divisions, was complied with and by June 30, over 500 parades of regiments or similar organizations had taken place while troops were en route to demobilization camps. Division parades were arranged for the Seventy-seventh, Twenty-sixth, Twenty-seventh and Twenty-eighth Divisions. Railroad equipment necessary to move troops in comfort was so limited that it was necessary to reduce the number of stops to a minimum. It should be remembered that half of the tourist equipment available within the United States is required to move one division, and that as no division could arrive en bloc at the ports, the first organizations to arrive might be held several days waiting for other ships to bring in the remaining units for parades. It was necessary to so arrange equipment that smaller detachments of troops, which were seldom accorded the welcome arranged for organized units, should not receive inferior equipment, and be forced to travel overnight in day coaches. Stops of any length for parades or receptions caused delays of 24 hours. A second consideration was that there was a widespread feeling among the men and their families against anything which postponed their arrival at their homes, and the War Department therefore desired that discharges should not be unduly delayed for parade purposes.

Statistics.—In concluding this account of the demobilization of personnel of the emergency army, it may be of interest to include some statistics. In comparing our demobilization with that of our Allies, it must be remembered that to demobilize the American Expeditionary Forces it was necessary to bring the men back across 3,000 miles of sea, while the French troops to be demobilized were already at home, and the British troops (except colonials) had only a short trip to make across the English Channel. The demobilization of troops which had not left the United States was also dependent to a considerable extent upon the return of troops from overseas, since many men had to be retained in the service here until the army from overseas had returned.

On January 4 the United States had demobilized 732,766 troops, while on January 3 Great Britain had demobilized 316,531. By February 1 the American and British troops discharged were approximately equal, 1,026,664 for the United States and 1,112,339 for Great Britain; after this date the British troops were demobilized faster than those of the United States.

On May 1 the United States had discharged 1,936,011 troops, while France, with no sea transportation involved, returned to the reserve 2,268,000, in addition to 600,000 enlisted men serving in factories engaged in production of war material and supplies.

COMPARATIVE STATISTICS IN THE DEMOBILIZATION OF THE UNITED STATES MILITARY FORCES AT THE CLOSE OF THE CIVIL WAR, THE WAR WITH SPAIN, AND THE PRESENT WAR.

Civil War.—The Volunteer Army of the United States (Regulars not included) reached its greatest strength on April 30, 1865, on which date it included 1,034,064 officers and men. The number of Regulars in service on that date has been computed at 26,898 officers and men. The Volunteers were not all mustered out at one time, but their numbers were gradually reduced from time to time, beginning May 1, 1865, following the surrender of the Confederate armies. The following statement shows the number of Volunteers mustered out and returned to their homes between certain specified dates:

Period.	Number of officers and men mustered out.	Cumulative.	Period.	Number of officers and men mustered out.	Cumulative.
1865.			1866.		
May 1 to Aug. 7.....	640,806	640,806	Jan. 21 to Feb. 15.....	33,730	952,452
Aug. 8 to Aug. 22.....	78,532	719,338	Feb. 16 to Mar. 10.....	15,435	967,887
Aug. 23 to Sept. 14.....	21,769	741,107	Mar. 11 to May 1.....	18,895	986,782
Sept. 15 to Oct. 15.....	44,098	785,205	May 2 to June 30.....	23,888	1,010,670
Oct. 16 to Nov. 15.....	15,758	800,963	July 1 to Nov. 1.....	12,351	1,023,021
Nov. 16 to Jan. 20.....	117,759	918,722			

A few volunteers were retained in service for special reasons after November 1, 1866. The last volunteer organization was disbanded December 30, 1867.

War with Spain.—The Volunteer Army (Regulars not included) reached its greatest strength on August 31, 1898, on which date it included 8,895 officers and 207,361 enlisted men, a total of 216,256 officers and men. On that date there were 2,323 officers and 54,039 enlisted men in the Regular Army, a total of 56,362 officers and men. The mustering out of the Volunteer forces which served in the Cuban and Porto Rican campaigns, or which were in training in the United States preparatory to service in these campaigns, began on September 5, 1898, the protocol having been signed on August 12, 1898, and terminated

on June 22, 1899. The following statement shows the number of officers and men of the Volunteer Army mustered out during each month of that period:

	Monthly.			Cumulative.		
	Officers.	Men.	Total.	Officers.	Men.	Total.
1898.						
September.....	98	2,238	2,336	98	2,238	2,336
October.....	1,415	35,060	36,475	1,513	37,298	38,811
November.....	1,884	45,478	47,362	3,397	82,776	85,173
December.....	507	12,426	12,923	3,904	95,192	99,096
1899.						
January.....	431	10,548	10,979	4,335	105,740	110,075
February.....	796	18,469	19,265	5,131	124,209	129,340
March.....	741	16,604	17,345	5,872	140,813	146,685
April.....	774	16,956	17,730	6,646	157,769	164,415
May.....	658	12,854	13,512	7,304	170,623	177,927
June.....	88	1,382	1,470	7,392	172,005	179,397

¹ Includes 46 officers and 1,216 enlisted men mustered out Feb. 20 to 26, 1899, in the Hawaiian Islands.

A number of volunteer organizations were held in service after June 22, 1899, for duty in the Philippine Islands during the insurrection. The last volunteer organization was mustered out on November 23, 1899.

War with Germany.—The United States Army reached its greatest strength on November 11, 1918, the date on which the armistice was signed. Its strength on that date has been computed at 188,434 officers and 3,482,454 men, a total of 3,670,888 officers and men. Demobilization was begun immediately after the armistice was signed, and reports received show that 127,160 officers and 2,596,355 men, or a total of 2,723,515 officers and men, had been discharged from service up to and including June 28, 1919. The following statement shows the number of officers and men discharged during each week of the period:

Week ended—	Weekly.			Cumulative.		
	Officers.	Men.	Total.	Officers.	Men.	Total.
1918.						
Nov. 16.....	73	.....	73	73	.....	73
Nov. 23.....	90	6,051	6,141	163	6,051	6,214
Nov. 30.....	430	37,362	37,792	593	43,413	44,006
Dec. 7.....	8,686	101,089	109,775	9,279	144,502	153,781
Dec. 14.....	9,310	206,604	215,914	18,589	351,106	369,695
Dec. 21.....	9,280	199,136	208,416	27,869	550,242	578,111
Dec. 28.....	8,886	75,678	84,564	36,755	625,920	662,675
1919.						
Jan. 4.....	4,572	65,519	70,091	41,327	691,439	732,766
Jan. 11.....	6,921	78,845	85,766	48,248	770,284	818,532
Jan. 18.....	4,794	77,284	82,078	53,042	847,568	900,610
Jan. 25.....	4,858	90,340	95,198	57,900	937,908	995,808
Feb. 1.....	4,880	85,976	90,856	62,780	1,023,884	1,086,664
Feb. 8.....	4,919	79,755	84,674	67,699	1,103,639	1,171,338
Feb. 15.....	3,988	71,048	75,036	71,687	1,174,687	1,246,374
Feb. 22.....	3,153	54,116	57,269	74,840	1,228,803	1,303,643
Mar. 1.....	3,463	52,552	56,014	78,302	1,281,355	1,359,657
Mar. 8.....	3,555	54,143	57,498	81,657	1,335,498	1,417,155
Mar. 15.....	2,558	57,007	59,565	84,215	1,392,505	1,476,720
Mar. 22.....	2,530	67,123	69,653	86,745	1,459,628	1,546,373
Mar. 29.....	1,964	62,121	64,085	88,709	1,521,749	1,610,458
Apr. 5.....	3,451	84,084	87,535	92,160	1,605,833	1,697,993
Apr. 12.....	2,379	64,518	66,897	94,539	1,670,351	1,764,890
Apr. 19.....	2,619	65,432	68,051	97,158	1,735,783	1,832,941
Apr. 26.....	2,613	60,249	62,862	99,771	1,796,032	1,895,803
May 3.....	3,753	78,523	82,276	103,524	1,874,555	1,978,079
May 10.....	3,377	85,860	89,237	106,901	1,960,415	2,067,316
May 17.....	3,028	87,111	90,139	109,929	2,047,526	2,157,455
May 24.....	3,058	91,552	94,610	112,987	2,139,078	2,252,065
May 31.....	3,431	78,191	81,622	116,418	2,217,269	2,333,687
June 7.....	3,798	98,768	102,566	120,216	2,316,037	2,436,253
June 14.....	3,052	99,123	102,175	123,268	2,415,160	2,538,428
June 21.....	3,507	90,692	93,999	126,575	2,505,852	2,632,427
June 28.....	2,845	90,503	93,348	127,160	2,596,355	2,723,515

As the result of corrections recently received the number of officers discharged since November 11, 1918, has been reduced by 2,260. This number has been deducted from the cumulative total for June 28.

It appears from a comparison of the figures in the above statements that a total of 640,806 officers and men were mustered out of service at the close of the Civil War between May 1, 1865, and August 7, 1865, a period of three months and one week; while a total of 1,246,374 officers and men were discharged from service between the signing of the armistice on November 11, 1918, and February 15, 1919, a period of three months and four days. Nearly twice as many discharges from service were thus effected during the present demobilization as during an equal period at the close of the Civil War. It is also to be noted that 63,643 more officers and men were discharged from service between November 11, 1918, and February 1, 1919 (a period of 2 months and 21 days), than were mustered out during the entire period of demobilization (1 year and 5 months) at the close of the Civil War. While it is true that the Army now being demobilized was more than three and one-half times as large as was the Union Army on April 30, 1865; nevertheless, taking into account the unsettled conditions prevailing in Europe subsequent to the signing of the armistice and the fact that the greater part of the Army had to be transported thousands of miles across the ocean before discharge, it appears that the rate of demobilization has been, both comparatively and actually, very high.

In spite of a few individual complaints, evidence from many different sources from every part of the country shows clearly and unmistakably that the best interests of the country as a whole have been safeguarded, and that fairness and equal treatment to the individuals in the Army have been secured by the system of demobilization.

The system formulated at once after the conclusion of hostilities worked out most expeditiously and satisfactorily. The determining principle throughout demobilization was that all of our soldiers whose services were no longer needed were entitled to discharge.

DISPOSAL OF PROPERTY.

The signing of the armistice resulted in the immediate direction of all activities of the supply system into new channels. It suddenly became necessary to properly dispose of millions of dollars worth of war contracts which were to be terminated and adjusted. Vast parcels of real estate which had been rented or otherwise acquired by the War Department awaited disposition. Incident to the undertakings of the War Department had been the arising of many claims of various sorts which now pressed for settlement; great quantities of war stocks and of raw material, the accumulation of which had been necessary to secure present and future supplies for the large emergency Army, were suddenly rendered surplus; it was necessary to completely reverse the processes of embarkation and shipment, except for the supplies still needed overseas. In addition to all these matters, the General Staff was confronted with the whole question of peace-time organization of the supply system of the Army, with all its attendant phases of procurement, calculation of requirements, standardization of material, storage, distribution, and transportation.

Cessation of production and terms of contracts.—The stoppage of the manufacture of war material, while somewhat analagous to the demobilization of men, involved many more complex considerations and problems. The latter could be effected by military orders; the former, however, was less an Army and more a national problem. Due to the labor situation, the demobilization of industrial organizations could not be effected immediately or simultaneously. It was obviously necessary that the production of some supplies must be continued and brought to a close gradually. There were involved in these questions the financial interests of industry to the extent of millions of dollars and there was thus made necessary the making up of a very delicate and comprehensive method of settlement. There were involved decisions concerning the types of supplies whose production might be continued for use as reserve stocks (such as ordnance, etc.) and the exact amount in which such material should continue to be produced. Another phase was that the manufacturer who had in good faith undertaken the production of supplies must in justice be allowed to continue, temporarily, the production of certain types of articles in order that he might avoid financial loss. The selection of types which, however, could be so continued was a matter in which the interests of the Government were intimately involved. There were also to be devolved exact methods for settling contracts and for making final payments and adjustments. Furthermore, the disposal by sale of surplus supplies could only be effected through the up-building of well thought-out methods.

Designation of surpluses and provision of reserves.—Immediately on the signing of the armistice, a study of the situation was made by the Equipment Branch in order to give the supply departments a basis for the cancellation of contracts and for the disposition of surplus stores. Instructions were sent them to retain on hand what would be necessary for the troops still in the American Expeditionary Forces, initial equipment for one complete army of 1,500,000 men plus 100 per cent, and also one year's supply for a force of one-half million men. This was, of course, only a temporary measure designed to enable the supply departments to cancel contracts and dispose of surplus stores, and it was specially intended that there should be a great margin of safety in order to avoid a possible shortage should the armistice prove short lived.

With the thought that the heart of the whole problem lay in proper designation of surpluses and provision of reserves, it was deemed advisable to create a reserve for war purposes in the Army, in an attempt to avoid a repetition of the serious lack of material existing upon the outbreak of this war. In the absence of legislation, it was considered that an organization consisting of one complete army of 20 Infantry divisions, 1 Cavalry division, and the necessary miscellaneous and overhead troops should be provided for in the case of another war. This totaled 1,447,000, and it was decided that equipment should be kept on hand to provide the full amount required to keep and maintain the peace-time army which, in the absence of action by Congress, was tentatively fixed at 500,000 men. This figure will, of course, automatically change at any time that Congress may take final action.

Obviously equipment and supplies that can be obtained in the open market do not need to be kept on hand in any quantities to provide

for an emergency. Field guns, however, and artillery of all kinds require at least one year to manufacture, and therefore, if the country is to be properly prepared for a war emergency, considerable quantities must be retained to take care of the necessary expansion of the peace army into one for war. All supplies were therefore divided into four classes: First, those which could be obtained in the open market within 30 days, and of this class there was to be no war reserve; second, supplies which required more than 30 days and less than 6 months to procure, of this class sufficient should be kept on hand to expand the peace army into the war army, giving a complete initial equipment; third, supplies requiring over six months and less than a year to procure, of which it was decided to retain an amount sufficient to maintain the war army for 6 months, and, finally supplies requiring over one year, which should be retained in sufficient quantities to maintain the war army for one year. All material on hand, in excess of these quantities, was ordered sold.

The establishment of this war reserve is a matter of great importance for the Army and for the country. It will avoid the serious troubles in equipping troops which occurred at the outbreak of this war, and will give the supply departments the necessary time to prepare for production in case of war.

Adjustment of contracts and claims.—One of the problems requiring immediate attention was the termination and adjustment of contracts under the provisions of which the war industries of the country were manufacturing supplies with abnormal activity. On November 11 work was under way on a large number of contracts and, in many cases, in anticipation of the signing of formal contracts. Reduction of expenditures without undue sacrifice of material already partly prepared, and, without disorganization of industry, was, of course, desired. To accomplish this, it was necessary to consider all contracts individually or in small groups, in order to decide whether it was advisable to allow the contract to be completed in full, or if not, to determine at what point it should be suspended. Guiding considerations in such cases were the degree of completion of articles under manufacture, the value of the material if completed for peace purposes or for the future Army program, and the claims of the contractors for damages. In addition to contracts which were allowed to run their full course, 25,196 contracts and agreements were suspended at various stages of completion, and have been liquidated or are to be liquidated. Such liquidation involves a careful determination of all expenses and obligations actually incurred by the contractor for materials, labor, plant facilities, subcontractors, etc., in accordance with the terms of the contract. In cases where no contract had been signed the problem was even more difficult, in that it involved a determination of what expenses had actually been authorized.

In the making and fulfilling of contracts, obviously, and in spite of the most scrupulous care and desire to render full justice to all concerned, many claims and disputes were bound to arise.

Omitting from consideration the value of all material actually delivered before or after the armistice, the value of the incompleting portions of these 25,196 contracts and agreements is estimated to have been \$3,775,000,000. Of this total, 18,318 contracts and agreements

of a value of \$1,483,800,000 had been liquidated to June 30, 1919. Of this value, 13.8 per cent was paid to the contractor in settlement costs.

Sale of surplus property and real estate.—At the termination of hostilities the War Department was confronted not only with a large number of contracts for the production of war supplies, but found on its hands enormous quantities of surplus property. This consisted of every variety of material used for the equipment and supply of an army in the field, materials for the manufacture of munitions, machinery used in manufacture, complete cities created to manufacture munitions, buildings and building material, wharves, railroads, railroad equipment, shipping, and land.

The condition of this property varied greatly. The principal classes into which property, other than real estate and buildings, was divided on a basis of its condition were, scrap, unserviceable but reclaimable, used but serviceable, new in stock, in process of manufacture, and on order but not yet in production. It was located in the United States, France, Italy, Canada, Chile, and Germany.

The problem involved not merely the sale of this surplus property, but also deciding in thousands of cases what portion should be declared surplus and what kept for immediate or future use. Neither portion of the task is yet completed. Final decisions on the amounts of many articles to be sold as surplus await the adoption by Congress of a definite program regarding the size of the Army and the extent of military training. It has been roughly estimated that the property in the United States which will ultimately be declared surplus has a cost value of approximately \$2,000,000,000. Of this, property costing about \$700,000,000 had been sold to the end of August, 1919, for about \$530,000,000, or 77 per cent of the cost. Surplus property in France has been estimated to have cost about \$1,250,000,000. The greater part of it has been sold to the French Government for \$400,000,000 and most of the remainder has been disposed of to various purchasers for nearly \$100,000,000. While this represents a much smaller percentage of recovery than was obtained for the property thus far sold in this country, it is considered very satisfactory in view of the fact that a much smaller proportion was new material and a much greater proportion was in the nature of fixed improvements, such as wharves, buildings, and railroads. Much of the latter class of property has little value for peace-time uses as located, and almost no salvage value for removal. The estimated cost of the property which the Army in Germany will have for sale is \$132,000,000.

A considerable amount of the surplus property in the United States will be disposed of by authority of Congress by transfer to other Government departments. The value of property to be ultimately so disposed of will probably approach \$100,000,000.

Just as the Operations Division of the General Staff was charged chiefly with the demobilization of the personnel of the Army, so has the Purchase, Storage and Traffic Division been charged chiefly with the disposal of surplus material, supplies, and real estate, and the organization developed for this purpose and the general procedure followed is outlined elsewhere in this report in connection with the account of the activities of that division.

VIII. MISCELLANEOUS ACTIVITIES OF THE ARMY DURING THE WAR.

The foregoing portion of this report has been concerned chiefly with the activities, during the war, of the War Department and of the General Staff, relating especially to the mobilization, organization, training, equipping, and transporting of the forces for the American Expeditionary Force in France.

An account of the work of the Army during this period, however, would be incomplete without reference to other arduous and important duties with which it has been charged, and I desire to make special mention in this connection of the work of the American Expeditionary Force in Siberia and of that of the troops on border duty in this country.

Nonintervention in Russia.—During the progress of the war, and especially after the collapse of the Russian Government and the consequent elimination of the Russian Army as an active factor in the maintenance of military operations against the Central Powers from the east, the suggestion was received by the department, from time to time, from many sources that this country participate in an armed intervention in Russia with the view of restoring order and a strong and stable government and of enabling, by our assistance, the Russian army to be reconstituted and utilized in a renewal of offensive operations on an enlarged scale against the German eastern front. This matter was given careful consideration by the department, but a thorough study of it in all its phases, including the transportation and other problems involved in the transporting and in the maintenance from this country of a force of effective size on the eastern front, showed that such action would be inadvisable. Furthermore, sound military policy demanded that all the energy and facilities of this country should be devoted, without cessation or interference, to the winning of the war on the western front, and it was decided that, with this purpose constantly in mind, any considerable diversion or dissipation of our forces, for the purpose of organizing an army of intervention in Russia or for any other purpose, would be entirely unwarranted.

American Expeditionary Force in Siberia.—While this policy was adhered to, it was later decided to send a relatively small force of American troops to Siberia for other special reasons. The decision to send a small expeditionary force to Vladivostok, which was announced in August, 1918, was arrived at after a careful consideration of the entire situation by the representatives of the Allied and Associated Powers. The plans and purposes of the United States in taking this action were made public at the time. They contemplated that this force should be utilized to render such protection and help as was possible to the Czecho-Slovaks against the armed Austrian and German prisoners who were attacking them, to safeguard as far as it might the country to the rear of the westward-moving Czecho-Slovaks, and to guard military stores which might later be needed by Russian troops, against capture or against destruction by German agents. In addition to these functions, which were essentially of a military significance, it was the purpose of this force to protect, and to assist in forwarding, large quantities of supplies which the Russian

authorities in this country has succeeded in shipping to Siberia. The resources of that country had been almost exhausted by the chaotic conditions existing there; the inhabitants, including the women and children, had practically no shoes or warm clothing, and had little food; there was great need of agricultural implements and of many of the articles of commerce which are essential to fruitful industry.

In order to do this, it was necessary to keep open, and to assist in the operation of, the Siberian Railroad, which was not only the main artery for transportation in Siberia, but was the only access open to European Russia. Partisan bands having no connection with any organized government, under transitory leaders giving allegiance to no authority, were constantly menacing the operation of the railway and the safety of its permanent structures.

Mr. John F. Stevens, in response to a request of the Provisional Government of Russia, had gone to Russia in the spring of 1917, and had been made official adviser to the Minister of Ways and Communications. The Russian Railway Service Corps, composed of American engineers, had also been organized by the Department of State. But, due to the Bolshevik uprising and general chaotic conditions, neither Mr. Stevens nor the Russian Railway Service Corps had been able to begin work in Siberia until March, 1918. It became apparent that under the existing conditions it would be impracticable for Mr. Stevens and the Russian Railway Service Corps to undertake the arduous task confronting them without the support of troops. The United States and Japan were the only two powers at the time in a position to act in Siberia in sufficient force to accomplish these desired ends, and it was jointly agreed between these two countries, with the approval of the Governments of Great Britain, France, and Italy, that each should send a few thousand men to Vladivostok for the purpose referred to, it being announced publicly by this Government that this action contemplated no interference with the political sovereignty of Russia and no intervention in her internal affairs, even in the local affairs of the limited areas to be occupied by our military force.

The War Department accordingly ordered to Siberia, for the reasons indicated, an expedition of a little less than 10,000 troops, under command of Maj. Gen. William S. Graves, which began arriving at Vladivostok in September, 1918. This expedition consisted of the Twenty-seventh and Thirty-first Infantry, from the Philippine Islands, and of Ambulance Company No. 4, Field Hospital No. 4, Evacuation Hospital No. 17, Service Park Unit No. 333 of the Motor Transport Corps, Depot Company No. 146 of the Ordnance Department, Company D, Fifty-third Telegraph Battalion, Signal Corps, and a detachment of engineers. To bring this force up to war strength about 5,000 men were sent from the United States. The immediate result was the successful reunion of the separated Czecho-Slovak armies and the substantial elimination in eastern Siberia of the active efforts of enemy prisoners of war. A period of relative quiet ensued and it became practicable to resume railway service.

A definite plan covering the supervision of the Chinese Eastern and Trans-Siberian Railways was arrived at in February, 1919, by

an agreement between the United States and Japan which provided that under an interallied committee with a Russian as chairman the technical and economic management of these railways was to be charged to a technical board of which Mr. Stevens was elected president, that the protection of the railways was to be placed under the allied military forces, and that each Government should give to Mr. Stevens the authority and the support necessary to make his efforts effective, it being understood that this plan was to be interpreted as a sincere effort to join these railways in the interest of the Russian people with the view toward their ultimate return without the impairment of any existing rights. The instructions to Gen. Graves directed him not to interfere in Russian affairs and also directed him to cooperate with Mr. Stevens and to take such action as might be necessary to give authority and support to him in the performance of his duties as president of the technical board to operate the railways.

The small force of approximately 5,000 which was in August and September, 1918, sent to Archangel to cooperate with the British and the French troops in the protection of valuable military stores, and in the guarding of the railway lines to Murmansk and Archangel, was withdrawn in June and in August, 1919. It constituted a part of the command of the commanding general of the American Expeditionary Forces in France and its work will doubtless be covered in his report.

Included in our expeditionary force under Gen. Graves were approximately 5,000 men who were enlisted or drafted for the period of the emergency. Soon after Congress authorized the resumption of voluntary enlistments on February 28, 1919, recruiting of men who desired service in Siberia was begun. The shipment of these men to Vladivostok to replace the emergency men was begun in June, 1919, and it is expected that all emergency men will have been replaced before another winter sets in.

Gen. Graves has been confronted with a trying and difficult situation. Eight thousand miles from his home Government; surrounded by ambitious commanders of many nationalities; and confronted by a people made desperate by want, cold and hunger, embittered by years of war and suffering, and subject to the influences of the most unprincipled agitators; with first one faction in control and then another; it has required great tact, firmness and good judgment to steer a straight and impartial course. He and his command have performed a difficult and arduous task with credit to themselves and to the country.

Troops on border duty.—During the progress of the war in Europe the work of the United States Army in protecting our southern border received a comparatively small share of the public attention and the importance of this work was not generally understood. The duties performed included patrolling the border in order to prevent bandits from crossing the international line and from making raids into the United States and committing depredations against the lives and property of United States citizens. While it was not practicable to maintain a continuous guard along the entire border, the border troops were distributed in such a way that information concerning raids might be acted upon with sufficient promptness to

minimize the dangers therefrom. The necessarily wide distribution of the border patrol and an entire absence of Mexican guards along wide stretches of the frontier, especially in the rough and sparsely settled frontier country rendered especially difficult the furnishing of adequate protection to our citizens and necessitated constant patrolling and, on occasions, the vigorous pursuit of bandits raiding on the American side of the Rio Grande.

An important duty of the United States troops along the border, during the part of active warfare against Germany, was to prevent unauthorized persons from crossing the border, and to require all crossings to be made at regularly established ports of entry. In view of the political situation persons crossing or attempting to cross at unauthorized places put themselves under suspicion as being bandits, guerillas, ammunition smugglers, violators of the neutrality law, spies, and German sympathizers or their agents. The established ports of entry were entirely in the hands of civilian officers with whom the military forces cooperated in every way practicable.

The officers and enlisted men of the Army on border duty were active in enforcing the embargo on shipment of arms and munitions of war to Mexico, which was declared in the proclamation of the President on October 9, 1915, and they were of material assistance to the civil authorities in preventing the violation of its terms. The troops also assisted in maintaining the censorship during the war and in preventing the transmission of important military information across our southern border to find its way ultimately to the German Government.

The necessity of preventing rival Mexican factions engaged in fighting each other near the boundary line from firing across our border and endangering the lives of American citizens in their homes, and the duty of the United States to preserve its neutrality and to intern any Mexican forces driven across the boundary line into the United States by a rival faction also demanded the constant watchfulness of our troops. It was, furthermore, necessary to guard important railway bridges, irrigating dams and reservoirs, and certain manufacturing plants near the border against possible attempts at destruction by German agents and sympathizers. Owing to the great length of our southern land boundary, it took considerable numbers of troops to patrol it. On May 4, 1918, the border patrol garrisons consisted of the equivalent of nine regiments of Cavalry, seven and one-third regiments of Infantry (including the Fourteenth Infantry Brigade), 1 regiment and 1 battalion of Field Artillery, 2 mounted battalions of Engineers, and 1 Field Signal battalion and 3,260 Infantry recruits under orders, total, 31,500 men. The following line organizations performed border duty throughout the entire period, or during the major portion of the World War: Infantry—Third, Nineteenth, Twenty-fourth, Twenty-fifth, Thirty-fifth, Thirty-seventh, Fifty-seventh Regiments; Cavalry—First, Fourth, Fifth, Seventh, Eighth, Tenth, Eleventh, Twelfth, Thirteenth, Fourteenth, Sixteenth, and Seventeenth Regiments; Field Artillery—Fourth and Eighty-second Regiments. The Sixty-fourth Infantry and Third Field Artillery performed border duty for a considerable period prior to being sent overseas. There were other organizations also stationed on the border for shorter periods which are not enumerated in the above lists.

This work required many small and isolated detachments, the patrols from which were continually exposed to ambush and attack from bandits. Its nature was such as to render it, to an exceptional degree, both arduous and dangerous. The efficient and faithful services of the officers and enlisted men charged with its performance under most trying conditions merit the highest commendation.

IX. CONCLUSION.

LESSONS OF THE WAR.

The lessons of this war are many and important. Probably no great industry or activity exists in the country which has not gained, during the mobilization of the resources of the Nation which was accomplished during the war, experience which, when analyzed and studied, will be of great and lasting benefit to it and to the Nation. Undoubtedly the country has incurred much expense, and has lost many lives on account of the improvisations which were inevitable on account of its lack of preparedness for war, and it is essential that the lessons which have crystallized out of the experience of the War Department, as of the other great agencies directly concerned in the war, be heeded and profited by if this tremendous toll of wealth and of life is not to have been in vain.

In the preceding pages of this report there have been outlined some of the steps in the evolution and development of the organization and of the methods used in planning and in executing the military program, including the organizing, training, transporting, and supplying of the Army. This development has been gradual; each step has taught its lesson, and the lesson should not require repetition in any future war.

Before the war the theory was frequently advanced that future wars would, due to the terrible efficiency of modern instruments of warfare, be short and decisive. In this war the scientific and technical skill of the world has been concentrated for four years on the problems of devising either new death-dealing devices or means of protection against them. The history of the war, however, has shown that this theory is untenable. It has shown that, on the contrary, a modern war is a war of nations rather than of armies; that it involves a mobilization of the entire resources of these nations, and that it will, therefore, require for its decision a length of time not incomparable with that of previous wars.

Necessity for General Staff control.—This consideration accentuates the necessity, already referred to in this report, of a War Department organization in future which is adequate to the efficient formulation and execution of a military program which will require a definite and effective articulation of the War Department with all the agencies involved in the mobilization of the industries, activities, utilities, and resources of the Nation. I have set forth in this report the fundamental principles upon which, in my opinion, such an organization must be based. I am convinced that without a properly organized and efficient General Staff charged with the responsibility for, and empowered with the authority to formulate and to execute, the Army program, it will, in any future war, as in

this and in every other war in our history, be impossible for the activities of the various agencies, services, and bureaus of the War Department to be controlled and directed, with promptness and effectiveness, to the attainment of the common end. It can be stated without qualification that the success of an army in modern war is impossible without such a General Staff.

Under the terms of the treaty of peace, the German general staff is abolished. Had the Germans won the war they would, in all probability, have prescribed somewhat similar terms for the United States. It was necessary that the legislative restrictions hitherto imposed upon the organization and activities of the General Staff be removed, upon the declaration of war, in order that the military program might be carried out, and the Army organized, trained, and commanded with the expedition and the efficiency that the country demanded. Unless these restrictions are permanently removed and the General Staff is established upon a proper basis, the experience gained during this war will have been largely without avail, restrictions not incomparable with those that might have been expected from a German victor will have been imposed upon the General Staff, and it is inevitable that a future war will find this country as unprepared as it was for this war—with consequences which may endanger the Nation.

Necessity for reserves of clothing and equipment.—On the declaration of war the mobilization and the training of the Army suffered inevitable and serious delay due to the lack of an adequate reserve supply of winter clothing and other equipage and equipment required for training, which could not be manufactured in a short time. It was necessary to improvise this equipment. It became necessary to send to France entire brigades of Artillery with such meager and totally inadequate training as could be gained from drill with wooden logs mounted on ash carts. It should never be necessary for this lesson as to the necessity for an adequate reserve of material to be learned again. Fortunately, it will be practicable, from the tremendous amounts of material of all kinds that were coming into quantity production on the signing of the armistice, four years after the beginning of the war, and a year and a half after our entry into it, to make reasonable provision in this regard for the future.

Supply and training of officers and replacements.—Reference has also been made to the necessity of making adequate and special provision in any future contingency for the organization and training, in the early stages of mobilization, of officers, and of replacements and special troops. In this war it was necessary to train approximately 180,000 officers who had had little, if any, previous military training. The Regular Army consisted of less than 6,000 officers, of whom more than 1,000 had less than two years' service. It was necessary to use a large number of these trained officers for the various staff and other duties required to mobilize the Army; the training of the officers and men required for the new Army could not, for months, be effective. There can be no avoiding a recurrence of this situation except to provide an adequate reserve of trained officers and men.

Due to our lack of preparedness, the execution of our military program necessitated the sending to France and into battle of some organizations and replacements without proper training; undoubtedly the lack of proper equipment and instructors for training re-

sulted, in some cases, in a loss of lives that might have been avoided with well trained and disciplined officers and men. This action was taken only because of the firm conviction that it was imperative. There was no alternative if the war was to be won without a prolonged struggle resulting in an aggregate loss of life far exceeding that which actually occurred. The disadvantages were great and were fully considered. Events have proved that they were the price of victory. It is a price that it should never be necessary to pay again.

The war has taught many lessons; the principles of warfare, however, remain unchanged. It was not won, as some had predicted it would be, by some new and terrible development or modern science; it was won, as has every other war in history, by men, munitions, and morale.

Viewed as a whole it has many of the characteristics of a single great battle. Like a battle it began with a period of maneuvering for position, which developed into a period of close contact and attrition, and like a battle it terminated in a short period of decision in which the victory was won by an offensive operation which, by the utilization of a strong and effective reserve, became overwhelming in its effect. It differs from any previous battle chiefly in the magnitude of the forces, material, and time involved. With the entire man power and resources of great nations mobilized and engaged the period of contact and attrition occupied years instead of hours or days as in previous battles. Only the determination, the valor, and the sacrifices of our allies throughout this terrible period of ordeal by battle made it possible for us to furnish the final reserve which, with its impetuous vigor and its irresistible force, enabled the allied army to pass from the defensive to the offensive and made possible an early and decisive victory.

Development of special services.—The changes in warfare as the result of this war are in its practice only and not its principles. These changes have been, to a large degree, due to the development of the numerous and important special services which have been made necessary as the result of the concentration of the best technical and military skill of the world upon the application to military purposes of the most recent engineering and scientific developments. The remarkable development in aeroplanes, tanks, motor transport, railroad artillery, caterpillars, trench mortars, machine guns, gas warfare, radio and sound and flash ranging apparatus, and photography have modified in many respects the details and conditions of warfare, and have made possible operations of an unprecedented magnitude. In the Meuse-Argonne Battle the American expenditure of artillery ammunition is estimated at more than 4,000,000 rounds; in the battle of Gettysburg, the Union Army expended less than 40,000 rounds. Thus the development of motor transport has rendered practicable expenditures of artillery and machine-gun ammunition in amounts practically limited only by the production and transportation capacity of the country. In all of these developments the contribution of the American engineers has been conspicuous; the Liberty 12-cylinder aeroplane engine, the Browning machine gun, and the American gas-warfare equipment are noteworthy examples.

Important as has been the effect of these mechanical developments and special services, their true value has been as auxiliaries to

the Infantry. Nothing in this war has changed the fact that it is now, as always heretofore, the Infantry with rifle and bayonet that, in the final analysis, must bear the brunt of the assault and carry it on to victory. The war has taught the necessity of the appreciation by all officers of the interdependence of all arms of the service in battle. They are to fight together; they must be trained and taught together if the common knowledge of the powers and limitations of each arm, and the mutual confidence, without which efficient teamwork in battle is impossible, is to be attained.

Necessity for combined tactical training in large units.—The important lesson to be learned in this connection is that a reasonable efficiency in peace time training for war can never be secured until the present system of small, isolated battalion and company posts, which is a relic of the days of Indian fighting, is replaced by a system which enables entire divisions to be trained together and to be consolidated frequently for the maneuvers of larger units. By such a system only can commanding, staff, and line officers be developed and trained for the duties they will have to perform in modern warfare. That this is true has long been recognized by the responsible military authorities. For the first time in our history conditions now permit of its accomplishment; no one thing is more essential to the future efficiency of the military establishment than that this opportunity be taken advantage of.

The war has shown that the American ideas of the training of the soldier were sound and that the American-trained soldier has no superior. It has also shown that the principles underlying the instruction in our service schools for officers are sound. The results attained both in staff work and in the command and leading of troops in combat are remarkable, in view of the fact that opportunities for the training of officers in the actual command of, or in the actual performance of staff duties in, divisions and larger units have prior to this war been practically nonexistent. These results are largely attributable to the instruction given in the various service schools before the war, and they have emphasized the necessity for the continuation and development of these schools in the future.

As the result of the war the Army has many problems that must be solved. For every branch of the service there are questions of organization, equipment, and training. These are largely matters of detail which will involve a careful and well-considered study of the experience gained both in this country and overseas. These studies are already well under way. They will require much time and consideration for their preparation; there is no urgent necessity for their early completion.

There are, however, larger problems of the organization of the Army as a whole, affecting to a vital degree its efficiency, which press for early action.

There are also problems arising from the experience of the war which affect the military policy of the Nation itself.

Military policy as effected by the war.—The idea that a force of one and one-half million men could be transported within six months 3,000 miles across a submarine-infested ocean and there maintained was one unconceived of not only in our own war plans but in those of any other country. Perhaps no lesson of the war has been of more universal interest. We are not alone in having

learned it; it is one that must inevitably affect to a material degree all future military plans, both offensive and defensive, throughout the world.

At the beginning of the war this country occupied a position apart in world affairs. This position but reflected its geographical isolation from the continental great powers. As the result of the war, however, the position of this country has, in many important respects, undergone marked changes of far-reaching effect. Its geographical position, upon which it has long relied largely for its military defense, may no longer be regarded as isolated from the military operations of any possible powerful enemy. Its present international position must be recognized as being attended by tremendously increased responsibilities.

Our former position, international and geographical, had resulted in a long-continued national policy which precluded the adoption of a military policy upon which the country could depend with safety in time of war. It entered the war, therefore, practically unprepared for war. Its military power consisted almost entirely of its potential resources of man power, wealth, and munitions. These resources, while inexhaustible, were undeveloped and unavailable—to such a degree that the enemy considered it impossible for them to be rendered effective in time to permit the participation of the United States to become a potent factor in the prosecution of the war.

The national mobilization of these resources, including the complete and successful diversion to essential war work of practically every industry and activity of the country, between April 6, 1917, and November 11, 1918, rendered the participation of this country a decisive factor in the winning of the war for civilization and constitutes a national achievement of which we may well be proud. It is essential, however, that consideration be given to the fact that this mobilization of our resources, and this achievement, required a year and a half for its accomplishment and that it was possible only due to the extraordinary and unprecedented conditions that obtained during that period. It was possible for us to create, organize, train, equip, and transport an army, and to direct all of the activities of the Nation to its support and maintenance, only because of the assistance of our Allies, especially in supplying tonnage and equipment and in rendering available to us all the results of three years' experience in the war, and only because of the fact that by their heroic efforts and sacrifices, on land and sea, they protected us during this period of one and one-half years from the ruthlessness of the common enemy. Surely we can never expect to prepare for defense against the attack of a powerful and determined enemy again under such favorable conditions to ourselves.

The war has shown that this country can, in an emergency, be self-sustaining in all respects for an indefinite period. This is probably true of no other great power; certainly it is true of no insular power. This fact bears upon our policy of national defense. It follows that under any possible naval situation, even with our Navy and our fleets denied access to the seas by any conceivable combination of the other great navies of the world, this country could not be defeated and forced to capitulate by naval operations alone.

This, involving, as it does, our unlimited resources of man power and wealth, constitutes our greatest national military asset, provided, and only provided, we are prepared to prevent the landing on our shores of an enemy of the size which our own performance has demonstrated to the world can be landed by a first-class power under certain conditions. These conditions are that it shall have control of the sea and control of proper bases for debarkation. Without the possession of such bases in France we could not have landed our army irrespective of the fact that the Allies had control of the sea.

It is, accordingly, one of the very important lessons of this war that reasonable prevision and a sound military policy demand that there shall be at all times available for immediate use a sufficient trained and organized force to insure, in connection with our fixed coast defenses, that no probable or possible enemy can ever seize a great strategic base on our coast. With such a base in his possession it is not inconceivable that he could, within a short time, land a sufficient number of fully-equipped troops to seize and hold, by establishing a line of defense not incomparable in length with that held by the Germans on the western front, an area including such an appreciable portion of the resources and wealth of the country as to result in consequences of incalculable moment to the Nation.

Obviously such an attacking force, irrespective of its power on the sea, as represented by the strength of its Navy, and of its power on the land, as represented by the strength of its Army, will be at its weakest during the period it is attempting to land its army on our shores. During this period only will it be possible to nullify any numerical superiority of troops that he may bring to bear by the resistance of a trained and organized force of relatively small size. Only by the provision of such a force can we be assured that we shall be able to utilize to full advantage our greatest military asset, by gaining the time required to develop our resources and to organize an army which will be adequate to any contingency. The size of such a force, which is essential if the country is to be afforded that degree of protection which a sound military policy requires, must be determined by a consideration of our extended coast line, by the necessary dispersion of the force due to the distance from coast to coast, and by the necessity of providing for the safety of the Panama Canal and our other insular possessions.

Peace strength of Army.—The minimum force which, in my opinion, is adequate for this purpose is one field army of five corps, skeletonized to about 50 per cent of its strength, in such a way as to include a nucleus for all organizations which require extended training and instruction in time of peace, and as to be capable of ready expansion, in time of war to full strength without seriously impairing its efficiency for service.

Universal military training.—With such a force, and with a system of universal training which will insure an adequate reserve of officers and men to enable it, in case of emergency, to be expanded by Congress to such an extent as may be required, no foreign country could, in view of our performance in this war, disregard our rights or our military power. Such a system of universal training, which can be arranged so as to afford a negligible interference with the industrial and educational activities of the individual or of the nation,

will, by developing physically, mentally, and morally the youth of the country, make them better citizens as well as better soldiers. The force which I have indicated as being the minimum required by a sound military policy for the adequate protection of the country, could, without increase and without serious impairment to its efficiency, be utilized in time of peace to furnish, in great part at least, the trained, professional military specialists required to conduct efficiently such a system of intensive universal military training.

I have outlined some of the considerations which, in my opinion, must, in connection with the study of the experiences of the war, be regarded as bearing directly upon our national military policy.

Definite military policy now possible.—For the first time in its history this country is now, as the result of the war, in a position to formulate a definite military policy. All studies which have been made in this connection prior to the war have, necessarily, been academic. There has existed no supply of trained officers or men or of equipment and stores commensurate with the requirements of such a policy. No definite or adequate policy could be formulated which did not contemplate universal military service in time of war as the source of a national army; no precedents existed which warranted the assumption that such a system would be accepted by the country. Any war plans that might be prepared could only provide, on paper, for the disposition to be made of armies and supplies that did not exist, which could not be made available in case of an emergency and which could only be created by slow and evolutionary processes the nature of which could not be foreseen. Such plans were necessarily academic. To-day the entire situation is changed. The country has universally accepted and demanded, as the only rational and equitable solution of the problem that the great army required for our participation in this war be raised by the draft, and the nation-wide support of the draft act and the general satisfaction with its operation and its results can leave no doubt but that it may be accepted as the future policy of the country in time of war.

There are to-day in the country nearly 4,000,000 men and 200,000 officers physically and mentally fit and trained for war. No such reserve exists in any other country. It may be relied upon to meet the requirements of any possible contingency that may arise within the next five years. There is also a reserve of artillery, ammunition, motor transport, machine guns, rifles, and other military essentials that will amply provide for any possible requirement in the near future.

There exist complete cantonments, flying fields, firing and training centers, storehouses, and port terminals which will in general provide for any probable future requirements of peace or of war; steps have been taken to provide an adequate transport reserve, operating commercially but under American title and available on short notice for use in an emergency; the industries of the country have been trained to produce, with the minimum of delay, in time of necessity, the war materials which they are best adapted to produce, great plants have been constructed for the manufacture of explosives, and there exists an army of skilled workmen trained in the manufacture of every kind of military matériel. All this constitutes a national military asset of incalculable but in part of temporary value.

It makes possible now, as never before, the formulation of a definite military policy, which, by a reasonable and moderate utilization of the present and the future resources of the country, will insure, beyond all peradventure, that the future of the Nation will be safeguarded for all time. Had such a force and such a system of training as is above outlined been in existence in this country at the outbreak of the war, it is probable that Germany would not have dared, by the violation of the rights of this country under international law, to have brought the United States into the war. In fact, had such a force and system been in existence in England in 1914, it is, in the light of subsequent events, by no means improbable that Germany would never have begun the war at all.

During the period, of approximately one and one-half years, of our participation in the war, the War Department expenditures were approximately \$14,000,000,000 and the total war expenditures of the country were approximately \$24,000,000,000. The interest on either of these amounts would maintain indefinitely the scheme above outlined. Not only would it provide an army which would, in any case, have resulted in a material saving in the cost, not only in money but in lives as well, of the war to this country, but it would also provide for a system of universal military training which, in addition to being a military asset of incalculable value, would constitute a most potent factor in Americanizing and educating the great alien and illiterate population which otherwise, under the influence of unscrupulous and disloyal agitators, may become a national menace. That such an investment would be sound from the standpoint of national military policy is, in my opinion, indisputable; I am convinced that from the standpoint of national business and economic policy it is equally sound.

I have indicated in this report some of the lessons of the war which appear to be of special significance at this time. Such action as it has been possible to take, under existing legislation, to profit by these lessons, has already been taken.

Legislation proposed.—Since the submission of my previous report the study of the plan for the reorganization of the Army in the light of the experience that has crystallized out of the war, to which reference was made in that report, has been completed and, in the form of proposed legislation, has been submitted to you, with the recommendation that it be transmitted for the consideration of Congress. A copy of the proposed bill is appended to this report.

Conclusion.—In concluding this report I desire to express my appreciation of the splendid work of some of the many agencies that have, by their cooperation and assistance, contributed materially to the development and execution of the Army program. In the national mobilization that has been necessary every profession, industry, and trade has responded. The skill and advice of the eminent engineers, professors, physicians, scientists and business men who have put their services at the disposal of the War Department, either as officers or as civilians, have been to a large degree responsible for much of the progress made in the development in matériel and in organization. Without the unremitting labor of many of the governmental agencies outside the War Department, including the Railroad Administration, the War Industries Board, and the Shipping Board which have participated actually in the work of equipping and trans-

porting the Army, it would have been impossible to have accomplished the results that have been attained.

The work of the affiliated welfare organizations (Y. M. C. A., Y. W. C. A., National Catholic War Council, Jewish Welfare Board, the American Library Association, the War Camp Community Service, and the Salvation Army), as well as that of the many individuals, both men and women, who, in Red Cross work, theatricals, and in innumerable other ways labored unceasingly without regard to hours and weather for the welfare of our officers and enlisted men, has been a powerful factor in the maintenance of the matchless morale of our troops both in this country and overseas.

The thorough and efficient cooperation of the Navy made possible the transport of our Army overseas without the loss of a transport while under their protection on the eastbound voyage.

The Regular Army has imparted to the entire Army its standards and its ideals of duty, efficiency, loyalty, and justice. In the performance of the many responsible duties that it has been called upon to perform both in this country and overseas, it has lived up to its traditions and has added laurels to its history.

The American soldier, from whatever source, has, by his conduct, and by his self reliance, cheerfulness, initiative, aggressiveness, and valor, won the confidence and the unstinted praise of his comrades in arms of all nations. The magnificent performance of Gen. Pershing and his command in this war will always be a source of pride to all Americans.

P. C. MARCH,
General, Chief of Staff.

REPORT OF THE ATTORNEY GENERAL.

DEPARTMENT OF JUSTICE,
Washington, D. C., December 8, 1919.

To the Senate and House of Representatives of the United States of America in Congress assembled:

I have the honor to submit a report of the business of the Department of Justice during the fiscal year ended June 30, 1919, together with the renewal of recommendations of former years, some recommendations for new legislation, and a brief résumé of operations of recent date.

RECOMMENDATIONS.

ARREST AND REMOVAL OF PERSONS INDICTED FOR CRIME.

In its provision for the removal of indicted persons to the districts where the indictments were returned the Federal criminal procedure is grievously defective. A person indicted in a particular district, if found in another district, may successfully resist removal if a United States commissioner in the district where he is found is willing to find lack of probable cause; or he may give bond to appear, fail to do so, and, upon forfeiture of his bond and further removal proceedings, give a second bond, and so on indefinitely. Certain persons indicted for grave felonies enjoy absolute asylum within the United States and practical immunity from prosecution.

It is notorious that removal proceedings are more cumbersome, expensive, and uncertain than extradition proceedings.

As the criminal process of a State after indictment runs to any place within the State, so should a Federal warrant run to any part of the United States after indictment, but with privilege to the defendant to give bail.

This defect in the Federal criminal procedure has been frequently pointed out by my predecessors in previous reports.

I therefore urge that section 1014, Revised Statutes of the United States, be amended so that the judge into whose court an indictment is returned may consider the testimony introduced before the grand jury and enter an order making the warrant of arrest run to all parts of the United States.

KILLING A FEDERAL OFFICER.

Section 140 of the Criminal Code should be amended, making it a crime to kill an officer of the United States in the circumstances described in that section. Under section 140 of the Federal Penal Code it is a crime to assault, beat, or wound an officer of the United States engaged in serving or executing process, but there is no Federal law making it a crime to kill an officer under such circumstances.

SENDING THREATENING LETTERS.

It is no offense under existing law to send threatening letters through the mails unless in furtherance of a scheme to defraud or as a means of accomplishing extortion. Letters threatening injury to life or property may be sent with impunity. The law should be made to cover such cases.

THEFTS OF GOVERNMENT PROPERTY.

The uncertainty as to punishment prescribed in section 36 of the Federal Penal Code, which provides that thefts of property of the United States furnished for military or naval service shall be punished as prescribed in section 35, should be removed. The punishment for its violation being thus uncertain, section 36 is of little force.

PRESENCE OF STENOGRAPHERS BEFORE GRAND JURIES.

Attention was previously called to the division of opinion in the Circuit Courts of Appeals and district courts on the question as to the legality of having a stenographer present to report proceedings of grand juries. I again recommend that in order that all doubts may be removed the presence of a stenographer in the grand jury room for the purpose of reporting the proceedings should be specifically authorized by statute.

DEFRAUDING THE UNITED STATES.

There is great need for a statute punishing a single individual who defrauds or attempts to defraud the United States in any manner or for any purpose. Section 37 of the Federal Penal Code punishes two or more persons who conspire to defraud the United States "in any manner or for any purpose."

ASSIGNMENT TO OCCASIONAL SERVICE OF UNITED STATES DISTRICT JUDGES.

In the Annual Report of the Attorney General for 1918 attention was called to the fact that the business in the district courts and circuit courts of appeals frequently is of such character and volume as

to demand for its dispatch some assistance to the judges regularly sitting therein. Limited provision for such emergencies has already been made by existing law, and there would seem to be no reason why the entire Federal judiciary should not be made as mobile a force as possible.

The act of October 3, 1913 (38 Stat. 203), amending section 18 of the Judicial Code, provides that the Chief Justice may, if in his judgment the public interests so require, designate and appoint the judge of any district court in another circuit to hold a district court within the second circuit. I recommend an amendment to said section of the Judicial Code so as to extend its provisions to all circuits.

PREPARATION AND PRINTING OF RECORDS.

There is great need for legislation with reference to the costs incurred in the preparation and printing of the records of cases in the appellate courts. The act of February 13, 1911 (36 Stat. 901), entitled "An act to diminish the expense of proceedings on appeal and writ of error or certiorari," has led to confusion in the matter of fees and charges. A bill to clarify the matter will be prepared shortly in this department and submitted to the chairmen of the appropriate committees in Congress.

THE JUVENILE COURT.

The judge of the juvenile court has submitted suggested amendments to existing laws affecting the jurisdiction of the juvenile court of the District of Columbia, together with notes explanatory thereof, all of which will be found in Exhibit 31, page 636, of this report. These amendments are designed to meet situations which have arisen or defects which have become apparent to the judge during the year of service which she has just completed, several of which suggestions have also been made from time to time by her predecessors.

THE STATUTE OF LIMITATION IN BANKRUPTCY CASES.

Criminal prosecutions under the bankruptcy act must be brought within one year as the law now stands. This seems too short a period. Unquestionably it has defeated justice in some cases. To illustrate, most of the cases of embezzlement by trustees in bankruptcy have been disclosed by the periodical examinations of the offices of referees in bankruptcy conducted by this department. Speaking generally, it has never been found possible to conduct such investigations oftener than once every two years, except, of course, where there was reason to suspect wrongdoing. It frequently happens, therefore, that by the time such embezzlements are discovered the statute of limitation has barred prosecution. The period of limitation in such cases should be extended to three years.

AMENDMENT OF THE BANKRUPTCY LAW.

Referees in bankruptcy should be placed upon the same plane as were clerks of the United States district courts prior to July 1, 1919, by fixing a maximum limit for their compensation and requiring them to pay the excess into the Treasury of the United States.

Provision should also be made for the appointment in each district of one or more official trustees to take possession of a bankrupt's property automatically upon adjudication, or upon order of court in case of a contested adjudication. This would obviate the appointment and consequent cost of receivers, would prevent much scandal growing out of alleged manipulations of trusteeships and estates by referees and attorneys, and would bring to the trustee's office the benefits resulting from experience.

It should be made an offense to conceal assets not only from the trustee, as now provided by section 29*b* (1) of the statute, but also from any officer of the court charged with control and custody of property, including, for example, receivers and in certain cases the referee or the United States marshal.

The statute [sec. 14*b* (2)] now, in substance, forbids the discharge of a bankrupt if he has destroyed, concealed, or failed to keep proper books of account, with intent to conceal his financial condition. It seems desirable that, upon a showing by objecting creditors that the books have been destroyed or concealed or have not been kept, the burden of showing that that situation was not brought about with the specific intent mentioned should be placed squarely upon the bankrupt and not upon the objecting creditor. Similar action should be taken with respect to the burden of proof where there is a *prima facie* showing of the other grounds for refusal of discharge set out in paragraphs 3 and 4 of section 14*b*.

FEDERAL PAROLE AND PARDON BOARD.

The duty of passing on parole and pardon cases is an increasingly onerous one. The duties of the Attorney General in recent years have increased so greatly that it has become practically impossible for him to give to these cases the attention and thought which they require. It appears desirable that a board be created for the purpose of passing upon and recommending action to the President in pardon cases and for the purpose of finally approving paroles granted by the parole boards established at institutions where Federal prisoners are confined. It is recommended that a board of three men be constituted and fully empowered to handle this work. The jurisdiction over Federal penal institutions should also be vested in this board.

INCREASE IN PER DIEM FOR SUBSISTENCE WHEN TRAVELING ON
OFFICIAL BUSINESS.

Because of the increase in rates charged by hotels, restaurants, and dining cars, which, particularly in the larger cities, are two to three times in excess of the rates which obtained prior to the war, the allowance of \$5 a day for actual expenses of subsistence, or \$4 a day in lieu thereof, to officials and employees of the Government when absent from their designated headquarters on official business, is now grossly inadequate, and the officials and employees of this department have been compelled to pay the difference from their salaries. This amounts to a reduction in their compensation and is a genuine hardship.

To meet this condition and to relieve officials and employees of the Government from the personal payment of expenses of subsistence incurred solely in connection with the discharge of official business, it is respectfully suggested that the act of April 6, 1914 (38 Stat., 318), be amended to allow actual expenses of subsistence to the maximum of \$7 a day, and that section 13 of the act of August 1, 1914 (38 Stat., 680), be amended to authorize a per diem rate of allowance not exceeding \$6 in lieu of subsistence.

REAPPRAISEMENT IN CUSTOMS CASES.

Under the law as it now stands importers can (by an indirect method) get to the Court of Customs Appeals for what is practically a review of some of the questions of law involved in decisions on appeals to reappraisement. The Government has no such right of review. The Government's right of review ought to be coextensive with that enjoyed by importers.

Further, there are now three final reappraising boards which consider questions of fact and of law. As the three boards have concurrent jurisdiction, there is the natural result of conflicting and irreconcilable rulings on questions of law. Uncertainty could be eliminated by providing for a further appeal on questions of law to one final tribunal.

I renew the recommendation that the statutes be so amended as to permit both importers and the Government to appeal on questions of law directly from reappraising boards to the Court of Customs Appeals.

PORTRAITS OF JUSTICES OF THE SUPREME COURT OF THE UNITED STATES.

There is at the present time no complete set of portraits of the justices of the Supreme Court. Albert Rosenthal has painted a very fine set of portraits of the following Supreme Court justices:

1. Blair.	10. Wayne.	19. McKinley.
2. Chase.	11. Iredell.	20. Cushing.
3. Willson.	12. Moore. *	21. Brewer.
4. William Johnson.	13. Paterson.	22. Harlan.
5. Thomas Johnson.	14. Washington.	23. Brown.
6. Duval.	15. Livingston.	24. Peckham.
7. Trimble.	16. McLean.	25. Moody.
8. Todd.	17. Baldwin.	26. Lurton.
9. Thompson.	18. Barbour.	27. Daniel.

It appears desirable that the Government have a complete set of portraits of this nature and I recommend that this set, which is the only available one in existence, be purchased by act of Congress for the Government.

These portraits, with two exceptions, are now on exhibition in the Library Committee room of the National House of Representatives.

DEPARTMENTAL ACTIVITIES.

Shortly after my induction into office I effected a reorganization of the personnel of the Department of Justice. Coincident with this reorganization it became necessary to very considerably enlarge the activities of the department because of the new statutes which had placed larger investigational duties upon the Attorney General, and to this end an Assistant Attorney General was given entire charge of work of this character in the department. Theretofore an Assistant Attorney General had been the general administrative officer and he was also charged in a supervisory way with all investigational activities. In order to have available an Assistant Attorney General to place in charge of this work it was necessary to transfer the department's administrative duties to the chief clerk, Mr. C. E. Stewart, and under his new assignments he became in reality administrative assistant to the Attorney General. The additional duties and responsibilities thus imposed cover the entire business of the Division of Accounts, the office of the appointment clerk, the office of the disbursing clerk, and the office of the librarian. Matters involving the authorization of expenditures, both in the department in Washington and in the field, and those involving appropriations for contingent expenses, as well as salaries and expenses of officials in the field, and approximating \$4,000,000, were placed in charge of this officer.

In line with my general scheme for reorganization, early in my administration I transferred the force of examiners from the Bureau of Investigation to the Division of Accounts, thus bringing them within the jurisdiction of the chief clerk. This change facilitates both the work of the Division of Accounts and that of the examiners, transfers from the Bureau of Investigation a class of employees whose duties are closely allied with those of accountants in the department and relieves the officers of the United States courts from examination or investigation by a force whose primary duties are the investigation and prosecution of crimes. In addition to continuing and completing general examinations of offices of court officials previously commenced, examinations were instituted during the fiscal year 1919 in 24 other districts and about 35 special investigations were made relating to the manner of conducting business, the personal habits and conduct of officials, etc. The activity of the examiners has resulted in great benefit to the service by the improvement of standards and ideals pertaining to official duties as the outgrowth of constructive supervision.

The following is a brief statement of the status of various suits and actions based upon facts developed by the examiners:

1. The suits instituted some years since in the northern district of Illinois to recover from clerks and former clerks of United States courts moneys accruing as interest on official accounts are now pending in the Supreme Court and will probably be heard during the present calendar year.

2. In the test cases instituted in the eighth circuit to recover from referees moneys which the Government claimed they had collected improperly as fees and expenses, the Court of Appeals sustained the Government's right to sue on the bonds of the referees and remanded the cases.

3. A suit in the same circuit to determine the proper allowance to a district clerk for notices to creditors in bankruptcy was still pending at last report.

4. A suit instituted by a trustee in bankruptcy in the ninth circuit at the desire of the department was decided by the Court of Appeals in favor of the Government's contention that a referee in bankruptcy is not entitled to commissions on the costs of administration. (See *Simpson v. Laffoon*, 258 Fed., 229.)

5. Criminal cases against a former district clerk in the fifth circuit, who had misappropriated cost funds, were disposed of by pleas of guilty and a fine.

6. Criminal cases against another ex-clerk in the same circuit for similar offenses are still pending, but will probably be tried during the present fiscal year.

7. An investigation by an examiner in the eighth circuit in behalf of the Interior Department resulted in the indictment of three persons in connection with frauds relating to public lands. These cases are now awaiting trial.

8. One of the war contract investigations in another circuit revealed apparently extensive irregularities, resulting in the indictment of three persons. These indictments are now pending.

The examinations continue to disclose large individual incomes of referees in bankruptcy. This condition emphasizes the desirability for the appointment of official trustees, as heretofore recommended. In this connection attention is invited to the recent act of the Canadian Parliament which makes such provision. Under that act, as the provisions are understood here, trustees are appointed by the governor in council upon application made to the secretary of state of Canada. Every applicant for such appointment must state in his application full particulars of his qualifications, ability, and previous business experience. He must give general security to the King in a sum not less than \$10,000, and special security in special cases. Apparently he performs a number of the duties imposed in this country upon referees.

That act also includes a section limiting the compensation of attorneys for the trustee or the bankrupt estate.

The average number of examiners at work during the year was 12, others being diverted to war work or the Army. This condition has been corrected by the employment of additional examiners so that the number at present under appointment for field service is 18.

Further in accord with the reorganization I enlarged the duties which were theretofore assigned to the private secretary and assistant to the Attorney General, Mr. R. T. Scott, placing him in charge of the approval and recommendation to me of all classes of authorizations other than those charged to the chief clerk, of consideration and investigation of the qualifications of candidates for appointment to the field service, including the reviewing and collating of indorsements and the holding of personal interviews with applicants and those favoring or opposing appointments. He has also been charged with the duty of receiving complaints, initiating investigations, and preparing recommendations for the Attorney General where charges are made of misconduct or unfitness for office of United States attorneys, marshals, and other employees of the department, and reviews and makes recommendations in all matters relating to questions of general policy and the appointment of notaries public in the District of Columbia.

Appropriations made and amounts used thereunder for the Department of Justice and the courts of the United States for the fiscal year 1919 are set forth in detail in Exhibit No. 4; including special items, they aggregate \$17,126,725.43,¹ and \$16,219,340.02, respectively.

The estimates of appropriations needed for the fiscal year 1921, beginning July 1, 1920 (excluding estimates transmitted to the Commissioners of the District of Columbia, covering District items, and those transmitted to the Secretary of the Interior, covering Territorial items), aggregate \$17,914,471.35, an increase of \$3,899,954.35 over the like appropriations and \$2,084,060.70 over the like estimates for the fiscal year 1920, which commenced July 1, 1919.

The major causes contributing to the increases above mentioned are as follows:

- (a) Increased cost of supplies and equipment.
- (b) The change in the statutory salaries of United States judges.
- (c) The special and exceptional activity and prospective activity of the Bureau of Investigation.
- (d) The heavy increase and prospective further increase in the business transacted in the courts of the United States, both civil and criminal.

- (e) The heavy expense incident to the maintenance of a large number of Federal prisoners.

The estimates submitted through the Commissioners of the District of Columbia, which are not included in the figures given above, aggregated \$257,840, and those submitted through the Secretary of the Interior, \$125,000.

Because of the vast increase of the work in the department on account of war activities and the natural increase in business it was necessary to augment the force both in Washington and in the field service, although the limited appropriations prevented an increase in the force proportionate to the increase in business. This condition has necessitated an extension of the working hours of the majority of the officials and employees of the department, some of whom have forfeited vacations and given to the Government from 10 to 12 or more hours a day. It therefore affords me pleasure to find this opportunity to record my appreciation for the devotion of my entire staff to the interests of the Government. During the last fiscal year the personnel numbered approximately 525, including 18 officials in the legal and administrative branches, 67 attorneys, 344 clerks and special employees, and 96 subclerical employees, as against an approximate total of 427 of the year before, including 22 legal and administrative officers, 63 attorneys, 254 clerks, and 88 subclerical

¹ This amount does not include items carried by the deficiency act approved Nov. 4, 1919.

employees. The staff outside of Washington consists of 88 United States attorneys, 88 United States marshals, and approximately 160 special assistants to the Attorney General and to United States attorneys, 170 regular assistants to United States attorneys, 260 clerical assistants to United States attorneys, and 1,500 other employees.

Upon the request of the Committee on the Judiciary of the Senate the question of the sufficiency of the statutory salaries of United States marshals and United States district attorneys was investigated by the department. In order to obtain a satisfactory basis for general comparison statistical tables were prepared showing the average business and expenditures of the respective districts for a period of four years. These tables were considered in connection with special or peculiar conditions known to exist in specific districts.

The following schedule showing the present salaries of these officials and the salaries recommended, indicates the results reached by the department in this matter:

Judicial districts.	Present Salaries.		Recommended salaries.	
	Attorneys.	Marshals.	Attorneys.	Marshals.
Alabama:				
Northern.....	\$4,000	\$4,000	\$5,000	\$4,500
Middle.....	4,000	4,000	4,500	4,000
Southern.....	3,000	3,000	3,500	3,000
Alaska:				
First division.....	5,000	4,000	6,000	5,500
Second division.....	5,000	4,000	6,000	5,500
Third division.....	5,000	4,000	6,000	6,000
Fourth division.....	5,000	4,000	6,000	6,000
Arizona.....	4,000	4,000	5,500	5,000
Arkansas:				
Eastern.....	4,000	4,000	5,000	4,500
Western.....	4,000	4,000	4,500	4,000
California:				
Northern.....	4,500	4,000	6,500	6,000
Southern.....	4,000	4,000	5,000	5,000
Colorado.....	4,000	4,000	4,500	4,500
Connecticut.....	4,500	2,500	4,500	3,500
Delaware.....	2,000	2,000	3,000	3,000
District of Columbia.....	6,000	5,500	6,500	6,000
Florida:				
Northern.....	3,500	3,000	4,500	3,500
Southern.....	3,500	3,000	4,500	4,000
Georgia:				
Northern.....	5,000	5,000	6,500	5,500
Southern.....	3,500	3,500	5,000	4,500
Hawaii.....	4,000	3,000	4,500	4,000
Idaho.....	4,000	4,000	4,500	4,000
Illinois:				
Northern.....	10,000	5,000	12,000	6,500
Eastern.....	5,000	4,500	5,500	4,500
Southern.....	5,000	4,500	5,000	4,500
Indiana.....	5,000	4,500	6,000	4,500
Iowa:				
Northern.....	4,500	4,000	4,500	4,000
Southern.....	4,500	4,000	5,000	4,500
Kansas.....	4,500	4,000	5,000	4,500
Kentucky:				
Eastern.....	5,000	5,000	6,500	5,500
Western.....	5,000	5,000	5,500	5,000
Louisiana:				
Eastern.....	3,500	4,000	4,500	4,000
Western.....	2,500	2,500	4,000	3,500
Maine.....	3,000	3,000	4,000	3,500
Maryland.....	4,000	3,500	5,000	4,000
Massachusetts.....	5,000	5,000	5,500	5,000
Michigan:				
Eastern.....	4,000	4,000	4,500	4,500
Western.....	3,500	4,000	4,000	4,000

Judicial district.	Present salaries.		Recommended salaries.	
	Attorneys.	Marshals.	Attorneys.	Marshals.
Minnesota.....	\$4,000	\$4,000	\$6,000	\$5,500
Mississippi:				
Northern.....	3,500	3,000	3,500	3,000
Southern.....	3,500	3,000	4,000	3,500
Missouri:				
Eastern.....	4,500	4,000	5,500	4,500
Western.....	4,500	4,000	5,000	4,500
Montana.....	4,000	3,500	5,000	5,000
Nebraska.....	4,000	4,000	5,000	4,500
Nevada.....	4,000	2,500	4,000	3,500
New Hampshire.....	2,000	2,000	3,000	3,000
New Jersey.....	5,000	3,000	5,500	4,000
New Mexico.....	4,000	4,000	4,500	4,500
New York:				
Northern.....	4,500	5,000	5,000	5,000
Eastern.....	4,500	4,000	5,500	5,000
Southern.....	10,000	5,000	12,000	6,500
Western.....	4,500	5,000	5,500	5,000
North Carolina:				
Eastern.....	4,000	4,000	5,000	4,000
Western.....	4,500	4,500	5,500	4,500
North Dakota.....	4,000	4,000	4,500	4,000
Ohio:				
Northern.....	4,500	4,000	5,000	4,500
Southern.....	4,500	4,000	5,000	4,500
Oklahoma:				
Eastern.....	4,000	4,000	6,500	6,000
Western.....	4,000	4,000	5,000	5,000
Oregon.....	4,500	4,000	5,000	5,000
Pennsylvania:				
Eastern.....	6,000	4,000	7,500	5,000
Middle.....	4,500	4,000	4,500	4,000
Western.....	4,500	4,000	5,000	4,000
Porto Rico.....	4,000	3,500	4,500	4,000
Rhode Island.....	2,500	2,000	3,000	3,000
South Carolina:				
Eastern.....	4,500	4,500	5,000	4,500
Western.....	4,500	4,500	4,500	4,500
South Dakota.....	4,000	4,000	4,500	4,500
Tennessee:				
Eastern.....	4,500	4,000	5,000	4,000
Middle.....	4,500	4,000	4,500	4,000
Western.....	4,500	4,000	4,500	4,000
Texas:				
Northern.....	4,000	4,000	5,500	5,000
Eastern.....	4,000	4,000	4,500	4,000
Southern.....	4,000	4,000	5,500	4,500
Western.....	4,000	4,000	6,000	5,500
Utah.....	4,000	3,500	4,000	3,500
Vermont.....	3,000	2,500	3,500	3,000
Virginia:				
Eastern.....	4,000	3,500	5,500	4,000
Western.....	4,500	4,000	5,500	4,500
Washington:				
Eastern.....	4,500	4,000	4,500	4,000
Western.....	4,500	4,000	5,000	5,000
West Virginia:				
Northern.....	4,500	4,000	5,000	4,500
Southern.....	4,500	4,000	5,000	4,500
Wisconsin:				
Eastern.....	4,000	4,000	4,500	4,000
Western.....	4,000	4,000	5,000	4,500
Wyoming.....	4,000	3,500	4,500	4,000

The salaries which are fixed by law and the limits which are also fixed by law and appropriations as to many other salaries have not advanced, even approximately, in proportion to the advance of the cost of the necessities of life. Hence, there have been many resignations, not only among major officials, but on the part of assistant attorneys and clerks, deputy marshals and others, and much difficulty has been experienced in obtaining capable and satisfactory incumbents for official positions.

BUREAU OF INVESTIGATION.

WILLIAM J. FLYNN, Director.

1. WORK AND ORGANIZATION.

As stated in the annual report for the fiscal year ended June 30, 1918, the work of the Bureau of Investigation during that year was concerned very largely with matters arising out of the war. This condition continued through approximately the first half of the fiscal year ended June 30, 1919. Up to about the time of the signing of the armistice the number of special agents of the bureau continued to increase. Between November, 1918, and January, 1919, the number remained about stationary. Between January, 1919, and July, 1919, the number appreciably decreased. Since the latter date, because of increasing work, particularly in connection with the radical situation and the high cost of living, there has been a slight increase in the number of special agents.

On February 10, 1919, Mr. A. Bruce Bielaski, who had been chief of the bureau since April 30, 1912, resigned his position. Mr. William E. Allen, assistant to the chief of the bureau, became acting chief for the period which ended June 30, 1919. On that date the Attorney General directed that the bureau be placed under the direct supervision of the Attorney General's office. Pending such time as an assistant attorney general should be appointed to undertake this duty, Mr. John T. Creighton was designated to supervise the bureau. Mr. William J. Flynn, formerly Chief of the Secret Service of the United States Treasury Department, later Chief of the Secret Service and Police Section of the United States Railroad Administration, was appointed director of the bureau, and Mr. Frank Burke, formerly operative in charge of the New York office of the Secret Service Division and later in charge of the New York office of the Secret Service and Police Section of the United States Railroad Administration, was appointed assistant director and chief.

The signing of the armistice did not end the war activities of the bureau. Many violations of law which occurred during the period of active hostilities were reported to the bureau after November 11, and a very large though decreasing number of such reports are still being received.

It may be said, however, that the pressure of war work for the bureau is ended. In its stead the bureau is confronted with a very large and important task in connection with social and economic unrest which in part has grown out of the war. Unrest and radicalism are rife throughout the world; the United States is not exempt. The Department of Justice as the law-enforcing agency of the Government is deeply concerned with this situation, and the Bureau

of Investigation of the department has probably accumulated a greater mass of data upon this subject than is anywhere else available. Although ordinarily the bureau is concerned with the investigation of individual violations of law, in the matter of the radical situation it has consistently taken the attitude that intelligent investigations of individuals can be accomplished only by a thorough-going understanding of the situation as a whole. To this end there has been organized in the Bureau of Investigation a division of radical activities, the work of which is covered in more detail in another portion of this report.

2. DETECTION OF VIOLATIONS OF FEDERAL LAW.

Very important work has been done by the bureau during the year in connection with cases of alleged fraud in contracts between the Government and private firms. Many of these cases are exceedingly intricate, involving large sums of money. Among the larger investigations of this nature which have been completed are those concerning Coastwise Lumber & Development Co., the Air Nitrates Plant at Muscle Shoals, Ala., and Hog Island shipyard. These investigations will continue in considerable volume for some time.

The bureau has been charged with responsibility for the investigation of cases arising under the Reed-Jones amendment and section 240 of the Criminal Code, as well as cases arising under the war-time prohibition act. Many of these cases, because of the irresponsible character of the persons involved, have consumed an amount of time and effort on the part of agents of the bureau which have seemed out of proportion to the importance of the individual cases. The bureau has taken the position, however, that the successful investigation of these cases was necessary if for no other reason than to secure respect for Federal law. The effect of such investigation and the consequent prosecution has been particularly gratifying in the districts surrounding military camps, navy yards, etc., and in addition they have probably been a deciding factor in keeping at a minimum disturbances growing out of the steel strike.

The relations between the Bureau of War Risk Insurance and the Bureau of Investigation have been very close. Since July 1, 1918, the bureau has investigated about 3,000 cases arising under the war-risk insurance act. These investigations include:

1. Cases pertaining to contemplated awards of Government allowances where allotments had been made under circumstances which naturally raised the question of the validity of the claim of the allottee.

2. Cases where exemption was claimed from compulsory allotment and allowance by the enlisted man.

3. Cases where the dependency was not of such nature as to come within the provisions of the act, or the allottee was morally unfit to receive a Government allowance.

4. Cases of fraud.

As a result of these investigations, 1,400 cases have been assigned to United States attorneys for attention. More than 1,000 photostatic records of the bureau's files, together with briefs of the documentary evidence prepared by the legal division of the Bureau of War Risk Insurance, have been submitted to the United States attorneys. A considerable number of convictions have been secured in these prosecutions. Twenty-five hundred checks issued by the Bureau of War Risk Insurance have been intercepted by the agents of this bureau and returned to the Treasury. The checks thus actually intercepted approximate \$25,000, and the refunds actually secured by the activities of the bureau's agents probably amount to a similar total. These actual interceptions and refunds, however, represent but a small part of the value of the work of the bureau's agents. Information that such transactions are being closely watched spreads rapidly. There can be no doubt that a sum much larger than that mentioned above has been saved to the Treasury by the fear that attempted fraud would be detected.

Ten thousand investigations have been made in connection with alleged violations of sections 12 and 13 of the selective-service act; and under sections 5 and 6, 300,000 investigations have been inaugurated and completed, 95 per cent of which were delinquents. It is believed that 50,000 of these latter cases will develop into willful delinquencies for which indictments will be returned. A large number of deserters from the Army and Navy have been apprehended and delivered to the different camps for trial by courts-martial. The total number is approximately 1,500.

The work of the bureau in connection with the investigation of alien enemies continued actively during the first half of the year. Since that time, however, this work has very rapidly decreased. Additional details regarding this work are given in another portion of this report. Since the signing of the armistice the work of the bureau in this connection has very rapidly decreased and at the present time consists largely of investigations regarding interned alien enemies who wish to be paroled or whom it is thought desirable to have repatriated, and of investigations in connection with the granting of presidential exceptions to the alien enemy classification for purposes of naturalization.

While the work does not come within the fiscal year technically covered by this report, it seems desirable at this point to call attention to the work of the bureau in connection with the efforts of the department to reduce the high cost of living. Under date of August 11, 1919, the special agents in charge of the bureau's field offices were

instructed to cooperate with United States attorneys with all their available facilities in making the profiteering and living cost investigations. They were instructed that "such investigations must be given precedence over all matters, excepting such as are of pressing public importance or of emergency character." As a result of such instructions the situation in the entire United States was investigated by agents of the bureau who made detailed reports to the various United States attorneys and to the Washington office. Special arrangements were made in the Washington office for the critical inspection of these reports and for the coordination of the efforts of the field agents.

These investigations in many instances have been exceedingly difficult to carry to a successful conclusion because of the widespread activities of many business establishments engaged in these lines. In the case of one firm, for instance, which was believed to be hoarding sugar, it was necessary to conduct investigations in 95 cities and to bring all the evidence so accumulated together at Washington in order to ascertain whether or not the stocks carried by this company were in the aggregate excessive. Without the bureau organization this sort of investigation could not have been conducted. The material so collected is being made the basis of the present national campaign against the high cost of living.

On August 1, 1919, a definite division of the bureau was formed to deal with radicalism. As mentioned elsewhere in this report, the work of the bureau in this regard has not resulted in a large number of criminal prosecutions since the armistice by reason of the present state of permanent legislation on this subject. The Federal statutes are exceedingly limited in so far as they affect persons of American citizenship engaged in radical agitation. The efforts of this division have, therefore, been largely centered upon the activities of alien agitators with the object of securing the deportation of such persons. To this end very close relations have been established with the office of the Commissioner General of Immigration. Already this policy has shown results and it is believed that in the near future this country may be freed of the presence of a considerable number of undesirable aliens who have come as missionaries of unrest rather than as emigrants from oppression. Organized as it is, the work of this division is cumulative and the results of its work will be increasingly manifest.

At the same time it is clearly recognized that the present unrest and tendency toward radicalism arise from social and economic conditions that are of greater consequence than the individual agitator. An intelligent investigation of the agitator, of his work, and of the results of his work, therefore, demands an understanding of social and economic conditions as a whole. With no social or eco-

conomic theories to exploit, but with the simple desire to work intelligently and effectively, the division is steadily training a group of its agents to take in account these larger factors at the same time that they are investigating individuals. The results of this policy are already apparent.

In addition to its special agents the bureau has a staff of expert accountants. This staff was organized primarily for the investigation of reports of criminal violations of the banking laws of the United States, but its field of operations has been gradually extended until now it includes practically all matters in which the Government may have an interest and which may require the services of an expert accountant. During the fiscal year ended June 30, 1919, the number of bank cases brought to the attention of the department was 189, involving 214 defendants, as compared to 98 cases reported the previous year. Thirty-nine of these cases have been brought to trial, resulting in 32 convictions and 7 acquittals. Twenty-seven cases remain to be investigated. The average number of accountants employed during the year was 15, a decrease of 4 as compared with the fiscal year 1918. During the year, in addition to their regular work, the accountants have been called upon in connection with many of the investigations which have grown out of the neutrality and war statutes, as well as matters of dispute under contracts entered into with the Government. The accountants have also aided largely in securing evidence which resulted in the conviction of a number of persons charged with violations of the national banking laws and postal laws. Their services are also now being utilized in connection with the high cost of living investigation.

3. REORGANIZATION.

One of the first steps toward reorganization was a survey of the field force of the bureau. Since his appointment the director has spent a considerable part of his time in the field inspecting local offices and instructing personnel. A new spirit on the part of field employees is manifest as a result of the director's personal contact with them.

It is to be recalled that the Department of Justice is the law-enforcing agency of the entire Government. The Bureau of Investigation is the investigative agency of the entire department, and as such has occasion to deal with an almost infinite variety of cases. The work of the bureau is therefore necessarily complex, and must remain so. At the same time it is believed that the methods employed in handling this work can be very considerably simplified.

During the war the work of the bureau increased with abnormal rapidity. The number of cases presented for investigation multiplied many times over any preceding period. The entire bureau worked

under a stress that left small opportunity for doing more than meeting the individual problems as they arose. This was particularly true of the Washington office, which had to serve as a clearing house and directing agency for the entire organization. This unprecedented situation, coupled with the retirement of practically the entire administrative force of the bureau, produced a chaos in the records and organization of the bureau which was one of the most difficult problems that the new officers had to meet.

To deal with this situation the bureau has turned to a thorough study of its organization and methods. It is believed that as a result of this study orderly procedure will speedily be restored. Simpler methods are being installed to handle effectively the increasingly heavy and complex duties of the bureau. Substantial progress has already been made in this regard. An effort is being made by the present administrative heads to evolve a form of organization that will fix responsibility beyond question, that will coordinate activities as it has not been possible to coordinate in the past, and that will develop on the part of individuals in charge of various phases of the work a greater expertness than is at present possible.

HIGH COST OF LIVING.

In anticipation of the enactment of legislation which would enable the Attorney General to deal more effectively with profiteering and other causes responsible for the high cost of living, the department, in August, 1919, commenced to plan an organization so that there might be as little delay as possible in getting the work under way after the necessary amendments to the food-control act were passed. The natural nucleus of this organization were the former Federal food administrators, and, accordingly, they were asked to undertake the direction of the fair-price work in their respective States and to reorganize the former county fair-price committees to work in connection with the Federal agencies in the several States. There was a splendid response to this call to render gratuitous public service, and approximately 70 per cent of the former administrators accepted. The governors of the States were asked to recommend some one to serve as fair-price commissioners in the States where the former administrators declined to serve. There is now a Fair Price Commissioner for every State except six. Approximately 50 per cent of the former county fair-price committees have been reorganized. Through these committees the department is able to keep in close touch with prices throughout the country.

In every campaign of this character time is required to perfect an organization. The work is already beginning to show results, and

once the movement is started it will doubtless gain momentum rapidly.

Although the so-called food-control act remains in full force and effect until the termination of the war between the United States and Germany shall be proclaimed by the President, the United States Food Administration, which was created to control the distribution of food products, was forced to suspend activities on June 30, 1919, for the reason that no appropriation was made for its maintenance.

Immediately upon the removal of the restraining influences of the Food Administration upon dealers in food products the prices of practically everything in that line commenced to advance by leaps and bounds, and it became the duty of this department to undertake to deal with the situation to such extent as might be practicable under existing laws.

Profiteering and hoarding are partly responsible for the prevailing high prices. Section 4 of the act was directed principally against profiteering, and except for the unfortunate circumstance that no penalty was provided for the acts therein declared to be unlawful, the department would have been able to deal effectively with many cases of profiteering which came to its attention.

The President realized the gravity of the situation caused by the rapidly mounting prices of the necessities of life and appeared before you in person August 8, 1919, and urged an immediate amendment of the food-control act to extend its scope to all the necessities of life, to provide a penalty for violations of section 4, and to extend the life of the act into peace times. I also appeared before your committee in charge of the matter and urged that the amendments asked by the President be passed. As you know, the amendments became a law October 22, 1919. It is now possible to deal vigorously with all cases of profiteering.

While awaiting the enactment of additional legislation, the department did not remain inactive. Section 6 of the act provided a penalty for hoarding and section 7 authorized the seizure and sale of hoarded necessities. Up to the end of October, 1919, there had been 92 seizures under section 7, and in many of these cases prosecutions are contemplated under section 6. In addition, 22 instances of alleged hoarding have been called to the attention of United States attorneys for investigation, with instructions to seize the goods and prosecute the offenders if the facts warrant such action.

The seizures referred to were made in 18 different States and included the following commodities: Eggs, butter, cheese, pork, poultry, lard, fish, sugar, potatoes, coffee, flour, and canned goods. Approximately 4,800,000 dozen of eggs, 1,700,000 pounds of butter, 2,500,000 pounds of meat, and 20,000 cases of canned goods were included in these seizures.

It has been the policy of the department, whenever possible, to force hoarded goods into the normal channels of trade. To this end, 49 of the above-mentioned cases have been disposed of by releasing the goods under agreements that they would be sold, under the direction of the United States attorneys, within a specified time and at reasonable prices.

Prosecutions for hoarding have also been instituted under section 6 of the act. In two cases indictments have been obtained and these cases are now awaiting trial. In one case involving the hoarding of flour, the defendant entered a plea of guilty and the court imposed a sentence of five months' imprisonment and a fine of \$5,000. This case is now pending on appeal. The imposition of jail sentences will undoubtedly have a most salutary effect.

ADMIRALTY LITIGATION.

H. LA RUE BROWN, Assistant Attorney General.

An additional class of litigation of which the department has assumed jurisdiction arises from the operation of the considerable fleet of Government-owned merchant vessels acquired since the war. Section 9 of the shipping act of September 7, 1916, creating the Shipping Board, as interpreted and applied by the Supreme Court in the *Lake Monroe* case (reported in 250 U. S., 246), declares these vessels, while employed in commercial service, subject to all the laws, regulations, and liabilities of privately owned merchant vessels. It grants the right to enforce by libel proceedings in rem, on the admiralty side of the district courts, claims against them, which permit the vessels being taken into custody by the court and detained until proper stipulations are furnished for their release. Since the beginning of the calendar year 75 such proceedings in rem to enforce claims aggregating approximately \$3,000,000 have been brought against Government vessels. The losses for the most part relate to collision damages and claims for salvage services, and, in most instances, are substantial in amount, due to the high value and earning powers of merchant ships. The department has presented, and now has pending 36 claims against private vessels and their owners for Government losses, aggregating nearly \$2,000,000. The number of claims referred to this department for attention will constantly increase as new tonnage is completed and placed in service, and as vessels are released from the public service of the Army and Navy in which they have been operated and assigned to commercial trades.

While these claims are being asserted in rem against the vessels, resulting in their attachment or seizure, the department has generally been able to arrange promptly for their release, upon stipulation, without incurring losses through their detention. Through the

cooperation of the Shipping Board and the admiralty bar throughout the country, a form of Government stipulation, instead of a surety bond, has been furnished for their release. This course has resulted in saving substantial sums of money, which otherwise would have been expended upon surety premiums, or lost through detention of the vessels pending their release. The situation is, however, not satisfactory and the passage of a bill now pending defining the liability of the United States and obviating the possibility of detention of its ships will bring relief both to the Government and to those who have claims against it.

This department has had referred to it a number of claims against vessels, arising in foreign waters. In the majority of cases it has arranged with owners and underwriters having such claims to present them in the courts of this country. A number of claims, however, have been presented in foreign countries, where the department, through the cooperation of the State Department and the consular service, has been able to appoint local solicitors to arrange for the release of the vessels upon Government undertakings executed by the consul, and to defend for the Government's interests. The number of these claims will multiply as the vessels are assigned to foreign trades. The expenses incident to the defense of these claims are considerable, and ample appropriations to defray them are essential. Legislation dealing with this subject also is pending and its passage should be expedited.

Another class of cases referred for attention by the Secretary of War relates to claims for damages to vessels in the service of the War Department, sustained in foreign waters, many against privately owned vessels of allied governments and many against vessels owned by our allied governments. The actual presentation of these claims, of necessity, must be delayed until after the adoption, by convention or otherwise, of a proper method for their presentation and liquidation. Action toward securing proper relief in this regard appears proper, as otherwise they may be lost or prejudiced through delay.

OPINIONS.

On May 31, 1918, the President ordered that all law officers of the Government, excepting those in the Philippine Islands, including all law officers attached to any executive bureau, agency, or office specially created for the prosecution of the existing war, should exercise their functions under the supervision and control of the head of the Department of Justice, in like manner as the law had theretofore provided with respect to the solicitors for the principal executive departments and similar officers, and that any opinion or ruling by the Attorney General upon any question of law arising in any department, executive bureau, agency, or office should be treated as binding

upon all departments, bureaus, agencies, or offices therewith concerned. This order gave the Attorney General authority to render opinions upon questions of law not only to the heads of the executive departments, but also to the heads of independent establishments.

During the fiscal year 1918, 54 opinions were rendered upon questions of law, 10 being upon requests of the President, 39 upon requests of heads of executive departments, and 4 to independent establishments. In addition 2 are being held confidential upon the request of the head of the department or establishment to whom rendered.

WAR ACTIVITIES.

During the war there was established in this department a War Emergency Division, which handled cases arising under the war statutes. Since the signing of the treaty of peace, and as the emergency no longer exists, that division has practically been abolished.

The remaining cases and legal matters arising under those statutes have been assigned to the Criminal Division of the department. A great many cases have been handled under these statutes, but with the passing of the emergency this class of cases has, of course, diminished, with the exception of the selective service cases, which are now being pushed with vigor and will involve considerable work.

SELECTIVE SERVICE CASES.

There are pending a large number of draft cases now in the course of elimination and classification. These cases are being investigated for the purpose of segregating the willful delinquents from the non-willful, with a view to proceeding as promptly as possible with the prosecution of all willful cases. The records of the numerous draft boards are now in Washington and are being classified so that the investigating work, for the purpose of securing the necessary evidence with which to prosecute, can be proceeded with. A number of these cases will be moved for trial at the fall terms of court, and the others as speedily as it is possible to properly prepare them.

Violations of the above act involve the failure to register, failure to return questionnaires, making false statements in questionnaires, etc., and in view of the voluminous records of the various draft boards it was impracticable to proceed with the preparation of the cases until the records were all assembled in Washington and classified.

Prosecutions, however, in a great many instances were instituted during the fiscal year. There were pending at the close of the last fiscal year 2,021 cases; there were 15,262 prosecutions commenced during the year, and 7,873 cases terminated during that year.

Amongst the cases prosecuted under this act and passed upon by the circuit court of appeals are the following:

(1) *United States v. Pappens et al.*, northern district of California.—Defendants were convicted of violating section 13 of the selective service act, and judgment of the lower court affirmed by the circuit court of appeals.

(2) *United States v. Sugar*, eastern district of Michigan.—The defendant pleaded guilty and was sentenced to one year for failing to register, in violation of section 5 of the act. A motion was entered by defendant in arrest of judgment, but judgment was affirmed by the circuit court of appeals.

(3) *United States v. Louis C. Fraina et al.*, southern district of New York.—Defendants were convicted of conspiracy to bring about violations of the selective-service act. At the time of the last report this case was pending in the circuit court of appeals. That court has since affirmed the decision of the lower court.

(4) *United States v. Bentall*, district of Minnesota.—Bentall was convicted of aiding, abetting, counseling, commanding, and inducing another to refuse to register in the military service. The judgment of the lower court was affirmed.

(5) *United States v. Gruher*, southern district of New York.—The defendant was convicted of having conspired to violate the provisions of section 6 of the selective service law, the theory of the indictment being that in return for money Louis P. Cherey and Samuel J. R. Bernfeld were to aid the defendant by making certain false and incorrect physical examinations and false statements and certificates as to the fitness and liability of persons examined for service. Gruher was sentenced to two years in the penitentiary. The case was appealed and the judgment affirmed.

(6) *United States v. Goldstein*, northern district of Illinois.—Goldstein was convicted in the above district of unlawfully selling intoxicating liquors to soldiers in uniform, in violation of the selective service act. An appeal was taken to the circuit court of appeals and the judgment affirmed.

(7) *United States v. Pass*, western district of Washington.—Pass was charged with willfully failing and refusing to present himself for registration, in violation of sections 5 and 6 of the above act. He was convicted and the case taken to the circuit court of appeals, which court affirmed the judgment.

(8) *United States v. M. B. Breitmayer*, eastern district of Michigan.—The defendant was tried and convicted of violating section 5 of the selective service act for willful failure and refusal to present himself for, or submit to, registration. The case was taken up on writ of error and the circuit court of appeals found no material error in the proceedings and affirmed the judgment.

ESPIONAGE ACT.

The provisions of the act under which most of the cases arose are contained in section 3, Title I, although the act contains numerous other provisions. The effect of the prosecutions under this act has, no doubt, been beneficial in maintaining law and order.

At the close of the last fiscal year there were 496 cases pending, 968 cases were commenced, and 1,179 terminated.

After the signing of the treaty of peace sporadic instances of apparent violations have come to the attention of the department, but comparatively speaking, the number of actual cases arising since that time has been small.

Amongst the cases during the fiscal year were the following:

(1) *United States v. Doe*, district of Colorado.—Doe was indicted for violating section 3, Title I, and section 3, Title XII, of the espionage act, and found guilty. He

took the case to the circuit court of appeals and the judgment of the lower court was affirmed.

(2) *United States v. Deason*, western district of Texas.—This defendant, having made threats against and in the presence of a member or members of the local examining board because of his not receiving a different classification and for the purpose of bringing about a change in his classification, was indicted and convicted under section 3, Title I, of the espionage act. Upon a review of the case by the circuit court of appeals the judgment was affirmed.

(3) *United States v. Hall*, western district of South Carolina.—The defendant was tried and convicted under the espionage act for making false statements and doing other acts with intent to interfere with the prosecution of the war. Upon a writ of error from the circuit court of appeals it was held by that court that it was prejudicial error to admit evidence of threats made by the defendant against the President not connected with the acts with which he was charged, and the judgment was reversed.

(4) *United States v. Shidler*, district of Nevada.—Shidler was convicted of violating section 3 of the above act, for willfully and unlawfully making certain false statements with intent to promote the success of the Imperial German Government. This judgment was passed upon by the circuit court of appeals and affirmed.

(5) *United States v. Heynacker*, district of South Dakota.—The defendant violated section 3, Title I, of the espionage act by causing or attempting to cause disloyalty, etc., in the military forces of the United States by obstructing the recruiting and enlistment service of the United States when they were at war, and was convicted. Upon review by the circuit court of appeals the judgment of the lower court was affirmed.

(6) *United States v. Reitz*, district of South Dakota.—Reitz violated section 3 of the above act by using language with intent to obstruct the recruiting and enlistment in the service of the United States. The defendant took the case to the circuit court of appeals, which affirmed the lower court's judgment.

(7) *United States v. Shilter*, northern district of California.—Shilter was convicted of attempting to cause insubordination, disloyalty, and refusal of duty in the military and naval forces of the United States, in violation of section 3 of the espionage act. A writ of error was prosecuted in the circuit court of appeals, which court held that the indictment was insufficient to sustain the conviction and ordered the defendant discharged.

(8) *United States v. Sanberg*, district of Arizona.—The defendant was indicted, tried, and convicted for violation of section 3 of the act, by stating that our entry into the war was brought about by Wall Street interests to protect loans to the Allies; that the invasion of Belgium by Germany was justified; that the sinking of the *Lusitania* was justified on account of carrying supplies and ammunition, etc. The judgment of the lower court was reversed by the circuit court of appeals on the ground that the statements were made in a private conversation, and were only regarded as an opinion.

The following will show the further action taken during the last fiscal year in certain cases which were reported in the previous annual report:

United States v. Victor L. Berger, northern district of Illinois.—This case involves a conspiracy to violate section 3, Title I, of the act, by means of speeches, leaflets, pamphlets, and other literature attacking the war and conscription. The case had not been tried when the previous report was made. All the defendants have, however, since been found guilty by the trial court and sentenced to 20 years each. The case is now pending before the circuit court of appeals.

United States v. Balbas, district of Porto Rico.—Balbas was convicted in the district court of causing and attempting to cause insubordination, etc., by unlawfully, will-

fully, knowingly, and feloniously publishing certain false statements in the Spanish language, and was sentenced to two years in the penitentiary and to pay a fine of \$1,000. On writ of error to review the judgment in the circuit court of appeals the judgment was reversed on the ground that there was no evidence to sustain the verdict of the jury that the defendant published either article willfully, with intent to create insubordination, etc. The case was remanded to the district court for further proceedings.

United States v. Mead, western district of Washington.—The defendant was an I. W. W. organizer, who made certain utterances which were not directed against participation in the service of the American Army, but against participation of Canadians in the service of the British Army. The previous report showed that the defendant had been convicted but that the case was pending in the circuit court of appeals. The latter court has since passed upon the case and affirmed the judgment of the lower court.

United States v. Benedict Prieth et al., district of New Jersey.—The defendants were owners, publishers, editors, and leading writers of a prominent German language newspaper of Newark. The case involved a series of articles attacking the motives behind the war and suggesting nonparticipation of the German-Americans. In the last annual report it was stated that the jury disagreed upon the first trial and that the case was still pending in the trial court. After mature consideration of all the facts and the result of the first trial, it was generally conceded that it was extremely improbable that a conviction would result in the event of a second trial of the case, and the same was therefore dismissed.

United States v. Scott Nearing and the American Socialist Society, southern district of New York.—Nearing was engaged in making speeches and writing pamphlets against the war. One of these pamphlets was entitled "The Great Madness," written by Nearing and published by the other defendant, purporting to describe the manner in which big financial interests first conceived the scheme of creating a war which would instill patriotic emotions in the American people and divert attention from the wrongs committed by the capitalists themselves, and then proceed to carry their scheme into effect by bringing on the present war. At the time the last annual report was prepared the case was pending for trial. This case came to trial on February 5, 1919, and resulted in a verdict acquitting the defendant Scott Nearing, and found the defendant the American Socialist Society guilty upon two counts of the indictment. A writ of error has been taken on behalf of the American Socialist Society to the circuit court of appeals to review the judgment of conviction.

United States v. Emil Hernan, western district of Washington.—The defendant publicly exhibited and displayed a circular attacking the vocation of a soldier as the lowest and basest of all occupations. At the time of the last report the defendant was convicted and the case was pending in the circuit court of appeals. The appellate court held that the facts, together with the evidence, were amply sufficient to show the intent of the defendant to violate the espionage act, and affirmed the judgment.

United States v. Joseph F. Rutherford, eastern district of New York.—This was one of the important cases reported in the last report, involving religious antiwar propaganda, and grew out of the publication entitled "The Finished Mystery." The defendants were convicted in the lower court and at the time of that report the case was on appeal in the circuit court of appeals. The circuit court of appeals has now handed down its decision reversing the judgment of conviction and sending the case back for a new trial.

SABOTAGE.

The number of cases arising under this act was small, but the following are mentioned:

United States v. Frank Ernewein et al., western district of New York.—Ernewein was one of the defendants in the case against Eastman et al., previously reported,

which was a case against a group of foremen and workmen in the Curtis plant based upon an attempt to conceal cracks in aeroplane propellers. The jury acquitted the defendant Ernewein.

United States v. Frederick W. Bishoff and William Hinemeyer, district of New Jersey.—These defendants were indicted for a violation of the sabotage act. They agreed to blow up two plants at Irvington, in Essex County, N. J., in one of which war materials were being manufactured and in the other ammunition was being stored and used in the loading of fuses for shells. Bishoff pleaded guilty and Hinemeyer was found guilty by the jury. Bishoff received a sentence of 25 years and Hinemeyer 15 years.

REGULATION OF THE CONDUCT OF ALIEN ENEMIES.

The signing of the armistice November 11, 1918, removed the necessity for the continuance of many regulations as to alien enemies: The President, accordingly, by proclamation of December 23, 1918, rescinded, to take effect December 25, 1918, regulations numbered 1 to 8, inclusive, and regulation 11 of the proclamation of April 6, 1917; regulations numbered 13 to 20, inclusive, of the proclamation of November 16, 1917; and all regulations as extended to women by the proclamation of April 19, 1918. These proclamations did not affect the department's authority over any alien enemy detained, arrested, confined, or interned for the violation of any regulations then in force, nor did it release any alien enemy from the obligations of a parole previously imposed upon him. The department's power to arrest, detain, and parole or intern dangerous alien enemies was not affected by this proclamation. This proclamation, however, abolished prohibited areas and permitted German alien enemies again to reenter the District of Columbia.

The department has, by virtue of authority delegated by the President to the Attorney General under the provisions of section 4067 of the Revised Statutes, caused the arrest under presidential warrant of approximately 6,300 alien enemies. Of this number, in excess of 2,300 have been delivered to the custody of the military authorities for internment. The remaining number, with the exception of a comparatively few who were released without restriction, were placed on parole.

The conclusion of hostilities made it incumbent upon the department to make arrangements for the disposition of alien enemies detained in the internment camps at Fort Oglethorpe, Ga., and at Fort Douglas, Utah. Commissioners representing the United States Government and the German Empire had met in Berne, Switzerland, at a conference beginning September 24, 1918, to discuss plans for the repatriation of civilian internees and of prisoners of war. The department was represented at this conference by Hon. John W. Davis, then Solicitor General, assisted by Mr. Charles Moorfield

Storey. An agreement was adopted and signed by the conference November 11, 1918. The signing of the armistice by the German Government on the same date rendered many provisions of the Berne agreement void, and it was not ratified by the Government of the United States.

The department was, however, willing to carry out many of the provisions of the Berne agreement with reference to the repatriation of civilian internees, and, in the beginning of 1919, began arrangements for the repatriation of interned alien enemies, particularly the former members of the German merchant marine who were detained, though not interned on individual presidential warrants, at Fort Oglethorpe, Ga. As soon as arrangements were made for travelers to reach Germany by way of neutral countries, the department expressed its willingness to consider the application of any interned alien enemy for repatriation at his own expense. As soon as the cooperation of the German Government was assured, the department joined with other branches of this Government and with the Swiss Legation in arranging for the general repatriation of all German internees willing to return to their native country. The first repatriation transports, upon which substantially all of the interned seamen were repatriated, with the exception of the small number of former officers and men of the German merchant marine who were permitted to remain in the United States, sailed from Charleston, S. C., June 28, July 2, and July 10, 1919, respectively. A fourth transport, upon which were repatriated prisoners of war who had been held by the War Department at Fort McPherson, Ga., sailed from Hoboken, N. J., September 26, 1919, and by the courtesy of the War Department a considerable number of civilian internees desiring repatriation were allowed passage on this transport. The inability or unwillingness of the countries comprising the former Empire of Austria-Hungary to cooperate with the United States in arranging for the repatriation of their interned nationals has made it impossible, up to the date of the writing of this report, to repatriate Austrian alien enemies who are not able to pay their own ocean and European transportation expenses.

The relaxation of the regulations as to alien enemies on December 25, 1918, induced the department to make immediate plans for paroling the less dangerous interned alien enemies who did not desire repatriation. The cases of all internees were summarized and classified preparatory to paroling those the occasion for whose detention had ceased. The process of considering applications for parole has gone steadily forward, with the result that parole and repatriation have decreased the population of the internment camps to approximately 300.

The department has not authorized the release of all interned alien enemies because it has believed that many of those arrested and interned have no proper place in the United States. The department has urged the enactment of legislation which will add to the classes of aliens who may be deported, in the discretion of the Secretary of Labor, those interned alien enemies who, after hearing, shall be found by the Secretary of Labor to be undesirable. The department's position in this respect was set forth in a letter dated May 27, 1919, to Hon. Albert Johnson, chairman of the Committee on Immigration and Naturalization, House of Representatives, Washington, D. C.:

I respectfully direct your attention to the necessity for the passage of some legislation which will provide power for the deportation and exclusion from this country of those interned dangerous aliens whose presence here would constitute a menace in times of peace. My predecessor, Attorney General Gregory, and the Secretary of Labor, under date of February 5, addressed to your predecessor as chairman of the Committee on Immigration and Naturalization a joint letter urging action of this character; and in compliance with their request the House Committee on Immigration and Naturalization subsequently reported to the House of Representatives for passage the bill H. R. 15098 framed in accordance with the views of the Attorney General and the Secretary of Labor. The bill, however, was not reached on the calendar and failed of passage. I inclose herewith for your perusal a copy of the joint letter addressed to your predecessor, together with a copy of the bill referred to.

Since February 5 the internment cases have been steadily reviewed and there have been released on parole from the internment camps a considerable number of the least harmful alien enemies. Between 500 and 700 of those now in internment desire repatriation to Germany. Making allowance for this number there will still remain in the internment camps a considerable number, about 500 of whom, in my opinion, would constitute a menace to the safety of this country in times of peace. These are persons whose acts of hostility toward this Government during the war could not be reached by the criminal laws, but they were, nevertheless, genuinely dangerous to our safety. In addition to this group there are approximately 150 aliens who during the war have been convicted for violation of the espionage act, the sabotage act, and various other so-called war statutes. In the two groups of aliens last described there are many who acted as official spies of the Central Powers, bomb plotters, enemy soldiers and sailors, official propagandists, as well as a large number who have criminal records in this country of a serious character. In my judgment these people ought not to be allowed to remain here.

In the present state of the law there is no way in which these dangerous interned alien enemies can be deported. Unless Congress takes some action to provide for their deportation under suitable restrictions as to hearings, procedure, etc., they will be turned loose upon the country as soon as a treaty of peace is ratified.

It is my hope that the inclosed proposed bill or some other measure of a similar character may be introduced and given immediate consideration by your committee. In view of the seriousness of the emergency I desire to fulfil my responsibility toward the people of the country by respectfully asking that suitable action be taken by your committee as quickly as possible to protect the nation in the premises.

Respectfully,

(Signed)

A. MITCHELL PALMER,
Attorney General.

H. R. 6750, providing for the possible deportation, both of interned alien enemies and of aliens convicted of violating certain

named war statutes, has, at the date of the writing of this report, passed the House of Representatives and is under consideration by the Senate.

The department has submitted to the Secretary of Labor the names of interned alien enemies of anarchistic and revolutionary tendencies, and deportation warrants have been issued for such of these individuals as in the opinion of the Secretary of Labor may be deported under the provisions of the act of Congress approved October 16, 1918.

The actual return to the conditions of peace in the United States has seemed to the department to justify the cancellation of the paroles of substantially all alien enemies who have not been interned and of a large number of those early released from the interment camps whose conduct while on parole has been satisfactory. United States attorneys and marshals and special agents of the Bureau of Investigation, in accordance with instructions issued by the department, have participated in the cancellation of paroles. In most cases paroles have been canceled only upon the recommendation of the paroling authority.

The conclusion of hostilities and the consequent decrease in the number of investigations of alien enemy activities in the United States resulted in the disbanding of the American Protective League, which was organized with the approval of the Attorney General and operated under the direct supervision of the Bureau of Investigation of this department. A number of private organizations which had been formed for the purpose of systematically detecting violations of law courteously offered to supply the Department of Justice with information of this character gathered by them. The department, while realizing the patriotic motives with which these organizations were formed, and while welcoming at all times information germane to its work from whatever source it may come, felt obliged to adhere to the traditional policy of the department to have no connection officially or semiofficially with any private organization. The department therefore instructed its officials not to enter into relationship with such extra-governmental associations.

NATURALIZATION OF ALIEN ENEMIES.

The naturalization law, as amended by act of Congress approved May 9, 1918, makes provision for the naturalization of three distinct groups of alien enemies, viz:

(1) Alien enemies whose declaration of intention had been made under the old law but whose first papers had become outlawed. The time within which these old-law declarants could complete their naturalization was extended to December 31, 1918.

(2) Alien enemies who had filed their first papers not more than seven nor less than two years prior to the declaration of war between the United States and the country of which they were nationals.

(3) Alien enemies not falling within the class last above described, but who had been prevented from obtaining second papers by reason of the declaration of war.

The department received approximately 1,200 applications from old-law declarants coming within the first class above mentioned. Although most of these applications were filed after November 1, 1918, in view of the fact that a final hearing was required prior to December 31, 1918, in order to preserve the validity of these declarations of intention, their applications were given immediate attention, with the result that all of them were acted upon prior to December 31, 1918. After thorough investigation, the presidential exception was granted and appropriate certificate made to the Secretary of Labor in 990 cases, leaving approximately 210 cases in which the application for the presidential exception was denied.

Investigation and report on alien enemies who had filed their first papers not more than seven nor less than two years prior to the declaration of a state of war between the United States and Germany or Austria-Hungary, depending upon the nationality of the applicant, was not a statutory duty imposed upon the department, but a task voluntarily assumed in the interest of protecting the country. By an arrangement of courtesy between the officials of the Department of Labor and this department it was agreed that the Department of Labor would refer to the Department of Justice for preliminary investigation the name of every alien enemy applying for citizenship, in order that the Bureau of Naturalization of the Department of Labor might have the benefit of any information contained in the confidential files of this department. This department has in its confidential files individual biographical reports on upward of 50,000 alien enemies. Of this number between 6,000 and 7,000 relate to alien enemies who have either been interned as dangerous alien enemies or at one time were suspected of disloyalty, and later, for one reason or another, released or paroled. The department has in its registration files more or less complete biographical information as to 480,000 male and female German alien enemies. The arrangement between the Department of Labor and this department was carried out until July 1, 1919, when the necessity of greatly diminishing the staff assigned to war work in this department required the department to restrict its reports on alien enemies belonging to the second category to such as were considered of especial significance by the Bureau of Naturalization.

The results of these many investigations of alien enemies applying for naturalization suggest that some arrangement should be made by which the Bureau of Naturalization can utilize material in this department's confidential files concerning these applicants.

Subdivision 11 of the act of Congress approved May 9, 1918, requiring affirmative action by the President excepting certain alien enemies from the alien-enemy classification after investigation and report by the Department of Justice fully establishing their loyalty imposed a heavy burden upon the department. Approximately 5,100 applications for the presidential exception have been received. The amount of intensive investigation on these cases is large and involves in addition much routine clerical work and special correspondence. In view of the amount of effort and expense connected with this work and the fact that it will necessarily cease upon the ratification of the treaty of peace, since July 1, 1919, the staff in the department assigned to this duty has been materially reduced. Final action has been taken in approximately 1,100 cases of applications for presidential exceptions. Nearly 600 of these have been denied, approximately two-thirds of the denials being without prejudice. The department's position has been that a recommendation for presidential exception should be given only upon unmistakable proof of patriotic service during the war. Approximately 2,000 cases are in various stages of investigation. Approximately 600 applications have been returned to the applicants for correction and have not been refiled with the department. Approximately 1,500 applications received for the most part since June 1, 1919, have been acknowledged and sent to the files and have not yet reached the stage of investigation. The department has appropriately acknowledged approximately 1,300 letters requesting forms upon which to make application for the presidential exception.

TRADING-WITH-THE-ENEMY ACT.

There are a number of cases under the trading-with-the-enemy act now pending, and a number of decisions of interest and importance have been rendered. Among them are the following:

1. *Rumely v. McCarthy, United States Marshal et al.*, in the Supreme Court of the United States (250 U. S., 283).—It was held in this case, upon habeas corpus proceedings, that the offense of failing to report the possession of enemy property to the Alien Property Custodian is committed in the District of Columbia, where the Alien Property Custodian has his office and the reports are by law required to be made.

2. *Salamandra Insurance Company v. New York Life Insurance & Trust Company*, in the southern district of New York (254 Fed., 852).—In this case it was held that an injunction would not be issued to restrain enforcement of demand issued by the Alien Property Custodian requiring property to be delivered to him pursuant to determination that the property belonged to or was held for an enemy. In addition, the constitutionality of the trading-with-the-enemy act, which had been attacked, was upheld.

3. *American Exchange Bank v. Palmer and Simon*, southern district of New York (256 Fed., 680).—In this case it was held that where the Alien Property Custodian had issued demand for a bank deposit and an American citizen was asserting that the property belonged to him, interpleader would lie, and the bank could be discharged by payment into court of the amount deposited with it and in dispute.

4. *City National Bank of Selma, Alabama, v. Dresner Bank et al.*, southern district of Alabama (255 Fed., 225).—In these cases a motion to dismiss the bill on the ground that the obligation sued for did not constitute a debt within the meaning of section 9 of the act was overruled; but the cases were continued until the termination of the war, in order that proper service might be perfected upon the enemy defendants.

5. *Francis P. Garvan as Alien Property Custodian v. Securities of the Munich Reinsurance Company and of other enemy insurance companies*, southern district of New York.—In these cases proceedings in the nature of a libel of information were filed under section 17 of the act for the purpose of enforcing compliance with demand issued by the Alien Property Custodian that the securities in question be delivered to him. It was held that the mere fact that prior to the war the securities had been deposited with trustees for American policyholders and creditors did not, under the terms of the deeds of trust, prevent a seizure of same by the Custodian, and that the remedy afforded by section 9 of the act provided adequate relief for the protection of whatever rights the trustees and the American creditors and policyholders might have. Appeals to the Circuit Court of Appeals have been taken.

6. *Hans Hohner v. Francis P. Garvan as Alien Property Custodian*, southern district of New York.—Hans Hohner, a citizen of Germany, who had taken out first papers under the naturalization acts, but had returned to Germany prior to the war without completing naturalization, sued to recover property belonging to him which had been seized by the Alien Property Custodian, upon allegations that he was in fact not an enemy. The bill of complaint was dismissed upon motion, and appeal has been taken to the Supreme Court of the United States. The constitutionality of the act was attacked, and treaties with Germany were relied upon.

7. *Helene K. Fischer vs. A. Mitchell Palmer as Alien Property Custodian et al.*, middle district of Pennsylvania (259 Fed., 355).—Plaintiff, a resident of the eastern district of Pennsylvania, brought suit in the middle district of Pennsylvania against the Alien Property Custodian and others to recover certain property claimed by her, which had been seized by the Custodian as the property of her father, a citizen and subject of Germany. The constitutionality of the act was attacked. The bill was dismissed, the act being held constitutional and the provisions restricting claimants of property held by the Custodian to a bill in equity as provided in section 9 of the act, in the district court of the district in which the plaintiff was an inhabitant, being sustained.

In addition to these cases, there were pending on November 1, 1919, in the various district courts of the United States a total of 127 cases. These include both actions to establish on behalf of some person not an enemy some interest, right, or title in or to money or property which had been seized by the Alien Property Custodian, and which is held by him or by the Treasurer; and also to collect debts owing from enemies whose money or property has been seized by the Custodian or the Treasurer.

In addition to these cases against the Custodian, there had been filed and were pending on November 1, 1919, in the various district courts, a total of 17 actions brought on behalf of the Alien Property Custodian for the purpose of enforcing compliance with demands issued by the Alien Property Custodian, and requiring delivery to him of property pursuant to the provisions of the trading-with-the-enemy act. Both classes of cases are increasing in numbers.

In addition to litigated matters, petitions to the Attorney General for the executive allowance of claims filed with the Custodian, pursuant to the provisions of section 9 of the trading-with-the-enemy act, have been acted upon as follows:

1. Claims for return of specific money or property:	
(a) Claims allowed.....	288
(b) Claims disallowed.....	32
Total.....	320
2. Claims for debt:	
(a) Claims allowed.....	107
(b) Claims disallowed.....	27
Total.....	134
3. Claims by American citizens who have lost enemy status, for return of money or property seized:	
(a) Claims allowed.....	142
(b) Claims disallowed.....	27
Total.....	169
4. Claims on behalf of citizens of allied nations resident in territory at one time under enemy occupation:	
(a) Claims allowed.....	40
(b) Claims disallowed.....	(¹)
Total.....	40
5. Claims of every kind acted upon:	
(a) Claims allowed.....	435
(b) Claims disallowed.....	59
Total.....	494

Dealing with these claims under the delegation by the President of his authority under section 9 of the trading-with-the-enemy act to the Attorney General has been a problem presenting many questions of novelty and difficulty. The Department has sought to be just and to be liberal in its point of view. It was felt, however, that all disputes of fact and most doubtful questions of law should be determined by the courts, as provided by the statute, and not made the subject of the exercise of Executive discretion.

REPORT OF THE SOLICITOR GENERAL.

ALEXANDER C. KING, Solicitor General.

THE SUPREME COURT.

The following table shows the result of last year's work of the Supreme Court of the United States so far as the number of cases present it. The same number of cases (582) was docketed on the appellate docket for the 1918 term as at the 1917 term. There was,

¹None.

however, an increase by 50 of the number of cases disposed of. The number of cases remaining undisposed of decreased from 495 to 408.

	Appellate docket—October term.										
	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918
Cases at close of previous term not disposed of.....	421	478	586	640	671	604	535	524	522	532	495
Cases docketed at the term.....	487	503	509	530	509	524	528	545	647	582	582
Total.....	908	981	1,095	1,170	1,180	1,128	1,063	1,069	1,169	1,114	1,077
Cases disposed of at the term.....	430	395	455	499	576	593	539	547	637	619	669
Cases remaining undisposed of...	478	586	640	671	604	535	524	522	532	495	408

A reference to the foregoing table shows a total of 1,114 cases on the appellate docket during the 1917 term. The number decreased during the 1918 term to 1,077.

At the close of the October term, 1917, there remained undisposed of on the appellate docket 495 cases and on the original docket 24 cases, making a total of 519. The number of cases docketed at the October term, 1918, was 593, of which 582 were placed on the appellate docket and 11 on the original docket. These, with the 519 cases remaining undisposed of, make the total number of cases pending at the last term 1,112, of which 1,077 were on the appellate and 35 on the original docket. Of this number 680 were disposed of during the term, 669 of which were on the appellate docket and 11 on the original docket, leaving undisposed of at the close of the October term, 1918, 432 cases, 408 being on the appellate and 24 on the original docket.

The number of cases actually considered by the court was 606, of which 204 were argued orally and 402 submitted on printed arguments. Of the 669 appellate cases disposed of, 154 were affirmed, 83 reversed, 102 dismissed, 53 were settled by the parties and dismissed; in 8 questions certified were answered, 262 were denials of petitions for writs of certiorari, and 7 were docketed and dismissed.

The total number of cases on the appellate docket in which the United States was a party or had a substantial interest disposed of at the October term, 1918, was 178. The United States was appellant in 36 of the cases, and appellee, etc., in 123; 3 were certifications of questions; 11 were cases of an original nature; and in 5 briefs were filed as *amicus curiae*.

Of the 36 cases brought up by the Government, 21 were decided in its favor and 6 adversely, 1 was affirmed in part, 1 was dismissed by the court, 5 were dismissed by the United States, and 2 petitions for writs of certiorari were denied.

Of the 123 cases in which the Government was appellee, etc., 39 were determined in its favor and 10 adversely; 1 was modified and affirmed; 4 were dismissed by the other side; 2 were dismissed under the rules; 5 were dismissed by the court; in 4 the Government confessed error; 4 were docketed and dismissed; 1 was "settled;" 2 cases were declared "moot;" and 51 were denials of petitions for writs of certiorari.

Of the foregoing 178 cases in which the Government had an interest, 26 were appeals from the Court of Claims; 8 of these were appealed by the Government, of which 3 were decided in its favor and 4 against it, and 1 was dismissed by the United States; 18 were appealed by the other side, 13 of which were decided in favor of the Government and 3 adversely, 1 was docketed and dismissed, and 1 was dismissed by the other side.

Fifty-nine were criminal cases; 8 being appealed by the Government under the criminal appeals act, of which 5 were decided in its favor, 2 against it, and 1 was dismissed by the United States. Fifty of these were appealed, etc., by the defendants, 8 of which were decided in favor of the Government, 3 were dismissed by the court, in 4 the United States confessed error, and 35 petitions for writs of certiorari were denied. In 1 case questions were certified, which were answered in favor of the Government's contention.

Eighty-six were appeals, etc., from the circuit court of appeals, in 13 of which the Government was appellant and in 65 appellee. Of the 13 in which the Government was appellant, 9 were decided in its favor, 1 was affirmed in part, 1 was dismissed by the United States, and in 2 petitions for writs of certiorari were denied. Of the 65 in which the Government was appellee, etc., 6 were decided in its favor and 4 adversely, 1 was modified and affirmed, 1 was dismissed under the rules, 1 was dismissed by the court, 1 was dismissed by the other side, and in 51 petitions for writs of certiorari were denied. There were three certifications of questions, all of which were decided in favor of the Government. Two of the above cases were from the Court of Appeals of the District of Columbia.

Five writs of certiorari were awarded in Government cases, in 1 of which the United States was petitioner.

Fifty-three petitions for writs of certiorari were denied. Of these cases the United States was petitioner in 2 and respondent in 51.

There were 2 cases from the Philippine Islands.

The Government was interested in 11 cases of an original nature, of which it was petitioner in 3. Eight of said cases were decided in its favor and 3 adversely.

In 5 cases the Government filed briefs as *amicus curiae*; 1 case was decided in its favor, 2 against its contentions, and in 1 case the court did not pass on the question presented, holding that the certificate of the Circuit Court of Appeals was not in proper form.

ABSTRACTS OF DECISIONS AT OCTOBER TERM, 1918.

The following are abstracts of the more important cases not hereinbefore particularly referred to, decided at the October term, 1918, in which the United States was a party or had an interest.

Ex Parte Hudgings, Petitioner (249 U. S. 378).

This was an original petition filed in the Supreme Court seeking petitioner's discharge from custody under an order of commitment by the district judge for contempt in wilfully refusing while on the witness stand to "answer certain questions truthfully." The Supreme Court held, in ordering petitioner's discharge, that in order to punish perjury committed in the presence of a court as a contempt there must be added the element of obstruction to the court in the performance of its duty.

The Lake Monroe (250 U. S. 246).

This was a petition by the United States for a writ of mandamus or prohibition to prevent the United States district court for Massachusetts from directing the seizure of the *Lake Monroe* to satisfy a claim for damages arising out of a collision. The main question was whether the *Lake Monroe*, a vessel requisitioned by the Emergency Fleet Corporation under the provisions of the emergency act of June 15, 1917 (40 Stat. 182), but chartered to a private concern for use as a merchant vessel, was subject to the provisions of the Shipping Board act of September 7, 1916 (39 Stat. 728), directing that every vessel purchased, chartered, or leased from the Shipping Board "while employed solely as merchant vessels shall be subject to all laws, regulations, and liabilities governing merchant vessels." The Supreme Court held that vessels taken over by the Emergency Fleet Corporation and chartered to operating agents under the act of 1917 were subject to the provisions of the original Shipping Board act, and thereupon dismissed the Government's petition.

Tempel v. United States (248 U. S. 121).

Acting in the interest of navigation, believing it to be public land within the *de jure* stream and not private property, the Government, not intending to exercise the power of eminent domain, dredged submerged lands of plaintiff in error in the Chicago River. Thereupon the owner brought suit under the Tucker Act to recover \$10,000--the reasonable value of the property. The district court rendered judgment for the United States on the merits. The Supreme Court held that the owner's cause of action, if any, was in tort, that there was no jurisdiction under the Tucker Act, and the suit should have been dismissed for want of jurisdiction.

United States v. Spearin; Spearin v. United States (248 U. S. 132).

Spearin contracted to build a dry dock at the Brooklyn Navy Yard. According to the terms of the contract a section of a sewer was to be relocated before work on the dry dock could be started. This was done in accordance with specifications furnished by the Government and accepted as satisfactory. Thereafter by reason of excessive rainfall and high tide, water was forced up the sewer to a depth of several feet. Because of the existence of a dam in a connecting sewer, unknown to both parties, and bad drainage conditions, known only to the Government, causing undue pressure, the sewer burst, overflowing the excavation for the dry dock. The contractor notified the Government that he would not proceed with work unless the United States made good, or assumed responsibility for, the damage caused and made such changes as would remove the menace to future operations. This the Government refused to do and annulled the contract. The Supreme Court, affirming the judgment of the Court of Claims, held that the Government impliedly warranted that the sewer constructed was sufficient to accomplish its object and that its refusal to accept responsibility to make working conditions safe for the future justified Spearin in refusing to continue work. The court further held that Spearin was rightfully awarded damages by the Court of Claims for all loss growing out of the breach of contract, including his expenditures [less receipts from the Government], and profits he would have made if the work had been completed.

G. S. Nicholas & Company et al. v. United States; Alex. D. Shaw & Company et al. v. United States (249 U. S. 34).

The tariff act of 1913 provided that whenever any foreign Government should bestow directly or indirectly any bounty or grant upon exportation of any article or merchandise therefrom, there should be levied in addition to the duties otherwise imposed an additional duty equal to the net amount of such bounty or grant. Under the laws of Great Britain certain allowances were directed to be paid in the event of exportation of wine and other spirits removed from duty-free warehouses for exportation. Whisky and gin so removed were imported into this country from Great Britain, upon which the customs collectors assessed additional countervailing duties. The Supreme Court held, affirming judgment of the Court of Customs Appeals, that the allowance provided for amounted to the bestowal of a bounty or grant under the provisions of the act and that such countervailing duties were rightfully assessed.

J. Homer Fritch, Incorporated, et al. v. United States (248 U. S. 458).

It was here decided that judgments of the district courts in suits against the United States under the Tucker Act of 1887 are reviewable directly and exclusively by the Supreme Court, and that such ex-

clusive jurisdiction was not disturbed by the judiciary act of 1891 or the Judicial Code, despite a contrary decision in *Ogden v. United States*, 148 U. S. 390. Accordingly a judgment of the circuit court of appeals affirming a judgment of the district court, in a suit brought under the Tucker Act, was reversed and remanded, with directions to dismiss for want of jurisdiction of said circuit court of appeals.

Cochnower v. United States (248 U. S. 405).

The construction of section 2 of the act of March 4, 1909, concerning compensation of certain officials in the customs service was involved. Said section authorized the Secretary of the Treasury "to increase and fix the compensation of inspectors of customs," etc. The question for decision was whether under the statute the Secretary had authority to decrease salaries. The Supreme Court, reversing the judgment of the Court of Claims, decided that he had not such power; that if Congress had intended to give the Secretary authority to "decrease" salaries it would have explicitly declared it; and that the effect of the words used was to give the Secretary power to increase salaries and thereafter establish (fix) the increased compensation as the legal compensation.

United States v. Brooklyn Eastern District Terminal (249 U. S. 296).

The question involved was whether the Terminal Company, which operates a union freight station under contracts with various interstate railroad and steamship companies to receive freight, unload it, transfer it to other lines, etc., for which it employs switching crews, handling at times from one car to eight, is a common carrier within the meaning of the hours of service act and therefore subject to the provision prohibiting, under penalty, service by employees engaged in the movement of trains for a longer period than 16 consecutive hours. The Supreme Court held that under the circumstances the company was a "common carrier" within the meaning of the act.

Kenny v. Miles et al. (250 U. S. 58).

Question arose in the County Court of Osage County, Okla., in the settlement of the estate of one Lah-tah-sah as to who were her heirs. There were two claimants—John Kenny, admitted to be her son and claiming to be the sole heir, and Laban Miles, claiming to be her surviving husband and an equal heir with Kenny. To prove the relationship Miles introduced a judgment of the district court of the same county in a partition suit wherein it was found that he and deceased had been married a year before her death. This judgment was admitted over objection as conclusive evidence of the relationship of the parties. It was accordingly adjudged that Kenny and Miles were equal heirs. The judgment of the county court was affirmed by

the Supreme Court of Oklahoma on the ground that the lands were unrestricted. The estate in question consisted of homestead and surplus lands patented to Lah-tah-sah under an act of Congress (1906) which contained provision tending to restrict alienation unless upon a certificate of competency from the Secretary of the Interior. A later act (1912) provided that no partition or sale of restricted lands of a deceased Osage allottee shall be valid until approved by the Secretary of the Interior. The judgment in the partition suit was never approved by the Secretary. The question therefore arose, first, whether the lands in question were "restricted lands." The Supreme Court, reviewing the pertinent legislation, arrived at the conclusion that the lands were "restricted lands." In view of this ruling and the fact that the Secretary had not given his approval of the judgment in the partition suit, the court further held that same was inoperative and that Kenny's objection was therefore well grounded. The judgment below was accordingly reversed.

Delaware, Lackawanna & Western Railroad Company v. United States
(249 U. S. 385).

The railroad company sought to recover additional pay from the United States for carrying the mails. It undertook the transportation at a fixed maximum price per mile, depending upon the average weight carried, "subject to future orders," however, and "unless otherwise ordered." Acting under subsequent legislation the Postmaster General readjusted the compensation for the carriage of mail matter and reduced the rates. Held, that there could be no recovery. That in view of the qualifying words quoted, the compensation was subject to change by the Postmaster General.

Seufert Brothers v. United States, as Trustee and Guardian of the Confederated Tribes and Bands of the Yakima Indians and Nations et al.; United States, as Trustee and Guardian of the Confederated Tribes and Bands of the Yakima Indians and Nations et al. v. Seufert Brothers Company (249 U. S. 194).

The question presented was whether a treaty between the United States and the Yakima Indians of Washington, which contained a provision permitting the tribe to fish at all accustomed places in common with citizens of the then territory, gave it the right to fish on the south or Oregon side of said river, in view of the fact that lands ceded by them under the treaty were on the north bank only. The Supreme Court held they were so entitled, as the evidence showed that the south bank had been habitually resorted to by these Indians and others for fishing purposes for a long period of time.

Chesapeake & Delaware Canal Company v. United States (250 U. S. 123).

The principal question involved was the applicability of a State statute of limitations and the doctrine of laches in a suit in 1912 to recover dividends declared in 1873, 1875, and 1876 on stock of the canal company owned by the United States. Held, that the Government was in the position of a creditor, was asserting sovereign and governmental rights in attempting to collect "public money," and, therefore, was not subject to either State statutes of limitations or laches.

Lane, Secretary of the Interior, et al. v. Pueblo of Santa Rosa (249 U. S. 110).

Suit was brought by the Pueblo to restrain the Secretary of the Interior and the Commissioner of the General Land Office from listing and disposing of as public lands certain lands claimed by the Indians to have been acquired by them under the laws of Spain and New Mexico. A motion to dismiss the bill was sustained in the Supreme Court of the District of Columbia. On appeal to the court of appeals the decree of dismissal was reversed, with directions that a permanent injunction be awarded. Two questions were raised on the appeal to the Supreme Court of the United States,—(1) whether the Pueblo was a legal entity and capable of maintaining a suit as such; and (2) whether the defendants should be subjected to a permanent injunction without opportunity to answer the bill. The court held, in respect to the first contention, that the Pueblo was capable of suing as a legal entity, by virtue of legislation incorporating the region into the (then) Territory of New Mexico and subjecting it to "all the laws" of New Mexico, among which was one providing that the inhabitants of any Indian pueblo having a grant or cession of lands from Spain or Mexico should be a body corporate and as such capable of suing and defending in respect to such lands. With respect to the second contention, the court held that the permanent injunction should not have been awarded without affording defendants opportunity to answer the bill, and remanded the cause to the court of first instance with appropriate instructions.

United States v. Union Pacific Railroad Company (249 U. S. 354).

The question at issue was whether the following were "troops" within the meaning of the various land grant acts and were entitled to transportation at the reduced rates provided therein over the Union Pacific road, a land grant line: Discharged soldiers, discharged military prisoners, rejected applicants for enlistment, applicants for enlistment provisionally accepted but subject to final examination and not sworn in, retired enlisted men, and furloughed soldiers en route back to their stations. Held, that they were not "troops" within the meaning of the acts.

United States v. Atchison, Topeka & Santa Fe Railway Company (249 U. S. 451).

The railway company undertook to carry the mails for certain quadrennial periods at a compensation based upon ascertained weights. Subsequently the parcels post act was passed, adding greatly to the weight of mail matter to be carried. To provide for the increased weight, legislation was enacted authorizing the Postmaster General to add to the compensation paid "not exceeding 5 per cent thereof per annum." Under the authority conferred, the Postmaster General apportioned increases among the various roads — never awarding in excess of 5 per cent. The railway company sued to recover the difference between the amount received by it and the amount it would have received if 5 per cent had been added. The Supreme Court held that the language of the statute was clear, and that the amount of increase was in the discretion of the Postmaster General, which had not been abused.

Alaska Pacific Fisheries v. United States (248 U. S. 78).

This was a suit by the United States to enjoin appellant from maintaining an extensive fish trap in the navigable waters adjacent to the Annette Islands in Alaska, on the ground, principally, that the trap was erected in a reservation set apart for the use of the Metlakahtla and other Indians. The act of March 3, 1891, defined such reservation as "the body of land known as Annette Islands," etc. The principal question involved was whether the reservation embraced only the uplands of the islands or included also adjacent waters and submerged land. The Supreme Court decided that in view of the location and character of the land, the vocations of the Indians as fishermen and hunters and their purpose in migrating to the islands to carry on such occupations, etc., it was plain that Congress intended to set apart the waters surrounding the islands as a part of the reservation, and affirmed the decree of the court below.

Rand et al., Executors, v. United States (249 U. S. 503).

This was a suit to recover a legacy tax alleged to have been erroneously assessed and collected under the inheritance tax provisions of the war revenue act of 1898. Revised Statutes, section 3226, provide that no suit shall be maintained for the recovery of a tax illegally or erroneously assessed or collected until appeal shall have been duly made to the Commissioner of Internal Revenue and the decision of the commissioner had therein. In this case money was given in trust to pay to Mrs. Rand (deceased) the annual income thereof in semiannual payments during her life. Two claims for repayment of the alleged illegally assessed taxes were filed with the Commissioner

of Internal Revenue, one on behalf of the trustee under the will and one on behalf of the administrator *de bonis non*, both of which claims were rejected. It was not shown, however, that Mrs. Rand or any person in her behalf had filed a claim with the commissioner. Held, that the requirements of the statute had not been complied with.

Lane, Secretary of the Interior, v. Darlington et al., Trustees, etc. (249 U. S. 331).

The right of the Secretary of the Interior to make an official resurvey of the boundary of a patented Mexican grant, in order to locate the original survey, was sustained in this case. The power of survey by the Secretary is not exhausted by a single exercise of it; and the resurvey, it was held, did not affect the rights of owners on the other side of the line already existing in theory of law. Dismissal of a bill praying an injunction to restrain such resurvey was therefore ordered.

Parker, as Superintendent for the Five Civilized Tribes, et al., v. Riley, a Minor, by Stockton, her Guardian, et al. (250 U. S. 66).

This case presented the question whether in an oil and gas lease of lands in which certain Indians had an estate for years entitling them to the rents, issues, and profits for such period, royalties derived therefrom would go to the tenant for years or to the remainder man. The court held that the royalties formed a part of the remainder estate and should be collected and invested by the Interior Department, and the corpus thereof go at the end of the estate for years to the remainder man. The interest on such investment should be paid to the tenant for years.

Brougham et al. v. Blanton Manufacturing Company (249 U. S. 495).

Appellee company was a manufacturer of oleomargarine under the trade name "Creamo," registered under the trade-mark law. Upon the enactment of the meat inspection act of 1906 the company's plant was subjected to inspection as a manufacturer of a meat food product by the Department of Agriculture. The trade name, approved by the Secretary of Agriculture, was subsequently by him denied to the company's use upon the ground that it was false and deceptive, inspection having developed the fact that the company in its manufacture of its product had replaced cream with skimmed milk. Held, that the company's product was a meat food product; that as such it was subject to the meat inspection act, which provided that no meat food product should be offered for sale under a false or deceptive name and that the trade-mark or name covering said article was subject to the approval of the Secretary of Agriculture; that in view of the fact that cream was no longer used in the manu-

facture of the product, the name "Creamo" was false and deceptive, and that the Secretary of Agriculture was therefore justified in refusing to approve the use of said name.

Houston et al. v. St. Louis Independent Packing Company (249 U. S. 479).

This case involved the power of the Secretary of Agriculture to prohibit the use of the word "sausage" as false and deceptive, within the meaning of the meat-inspection act of 1906, when applied to the product of appellee, a sausage manufacturer. The Secretary of Agriculture promulgated regulations providing that "sausage" should not contain cereal in excess of 2 per cent or water or ice in excess of 3 per cent. Appellee manufactured "sausage" containing cereal and water in excess of the requirements of the Secretary's regulation. The Secretary therefore refused to mark the product as "inspected and passed." Injunction was sought to enjoin the Secretary from refusing so to mark said product. The district court refused to grant the injunction. The circuit court of appeals reversed the judgment of the lower court. On appeal the Supreme Court decided that the question whether the term "sausage" when applied to product of appellee is false or deceptive within the meaning of the act is a conclusion of fact, the determination of which is committed to the decision of the Secretary by the authority given him to make rules, etc., for giving effect to the act, and that the conclusion of the head of an executive department on such a question will not be reviewed by the courts where it is fairly arrived at with substantial evidence to support it. The decree of the circuit court of appeals was reversed.

Moore v. United States (249 U. S. 487).

Moore brought suit against the Government to recover compensation for the use of a tool, covered by letters patent, of which he was the owner. The act of 1910 allows compensation from the United States for the use of patented inventions, but declares that the benefits of the act shall not inure to any patentee whose device was "discovered or invented during the time of his employment or service in the Government." The invention in question was completed during the time Moore was in the Government service, but in hours when he was not actually on duty. Held, that under the language of the statute the fact that the inventor worked on said device during the hours he was off duty was immaterial, and that the device was actually discovered during the time he was in the Government's employ.

Gulf Oil Corporation v. Lewellyn, Collector of Internal Revenue for the Twenty-third District of Pennsylvania (248 U. S. 71).

The question was whether dividends received by the Gulf Oil Corporation, a holding company, in 1913 out of surplus earnings accruing to its subsidiary corporations prior thereto, such earnings having been used in the enlargement of the plants and properties of the subsidiaries in the conduct of their business (the companies having no other money available to pay their debts), constituted taxable income to the petitioner corporation within the meaning of the income-tax act of October 3, 1913. The Supreme Court held that they were not taxable; that the holding company was no richer than before; that all these companies constituted a single enterprise; and that the transaction should be regarded as bookkeeping rather than as "dividends declared and paid in the ordinary course by a corporation."

Skinner & Eddy Corporation v. United States et al. (249 U. S. 557).

This case involved the construction of section 4 of the act to regulate commerce, as amended, which forbids the charging of a greater compensation for the transportation of passengers and property for a shorter than for a longer distance over the same line in the same direction. The Interstate Commerce Commission, upon application thereto and after a full hearing, had authority to grant relief to the carriers from the operation of the provisions of the section. Section 4 also provided that whenever a carrier by railroad in competition with a water route shall reduce the rates to or from competitive points it shall not be permitted to increase such rates unless after hearing by the commission it shall be found that such proposed increase rests upon changed conditions other than the elimination of water competition. Orders of the commission granting the transcontinental carriers relief from the operation of the provisions of section 4 because of competitive traffic through the Panama Canal were temporarily rescinded, and the carriers were permitted further to increase rates on numerous articles because of the disappearance in large part of such water competitive traffic by reason of the slides in the canal and the increased demand for shipping due to the World War. Skinner & Eddy, shipbuilders, Seattle, sought to enjoin the order allowing the increased rates on iron and steel articles upon the ground that the full hearing required by the statute had not been held by the commission; they also sought to enjoin the carriers from collecting the increased rates. The district court sustained the action of the commission and dismissed the petition of Skinner & Eddy. On their appeal the Supreme Court affirmed the judgment, holding that the prohibition against an increase of rates has no

application when the previous reduction was ordered by the commission after hearing upon application by the carriers, the commission having found that changed conditions "other than the elimination of water competition" existed.

Louisville & Jeffersonville Bridge Company v. United States (249 U. S. 534).

Appellant, a common carrier engaged in interstate commerce, operates a large terminal yard at Louisville. It is separated from the yard of the Illinois Railroad by a street, but the tracks do not run directly from one yard to the other. The question certified by the circuit court of appeals was whether a transfer of 26 cars as a unit from the yard of the terminal company to that of the Illinois Central Railroad Co., involving crossing and recrossing of several city streets and a main track movement of 2,600 feet at a speed reaching at times 15 miles per hour, constituted a "train movement" within the meaning of the safety appliance act, which would make it imperative under regulation of the Interstate Commerce Commission that 85 per cent of the cars so moved should have train brakes upon them used and operated by the engineer of the locomotive. The Supreme Court held that the movement described was a "train movement," to which the 85 per cent requirement concerning brakes applied.

United States v. Hill (248 U. S. 420).

A demurrer was sustained to an indictment charging Hill with carrying on his person intoxicating liquors for beverage purposes from Kentucky into West Virginia in violation of the Reed amendment of 1917. This act provides that whoever shall cause intoxicating liquors to be transported in interstate commerce with certain exceptions into any State or Territory the laws of which prohibit manufacture and sale therein of intoxicating liquors for beverage purposes shall be punished, etc. The laws of West Virginia forbade the manufacture and sale of intoxicating liquors for beverage purposes, although they permitted the bringing into the State of not more than 1 quart of liquor in any 30-day period for personal use. The court below sustained the demurrer on the ground that the words of the act "transported in interstate commerce" were intended to apply only to liquor transported for commercial purposes. The Supreme Court decided that this was too narrow a construction of the act; and, further, that the fact that the State saw fit to permit the introduction of liquor for personal use in limited quantity could in no wise interfere with the authority of Congress under its plenary power over interstate commerce to make the prohibition against interstate shipment of liquor contained in the act. The judgment of the district court was accordingly reversed.

United States v. Doremus (249 U. S. 86).

This case involved the constitutionality of section 2 of the Harrison Narcotic Act of 1914. The act purported to be passed under the authority of the Constitution, Article I, section 8, giving Congress power "to lay and collect taxes, duties, imposts, and excises to pay the debts and provide for the common welfare; but all duties, imposts, and excises shall be uniform throughout the United States." The Supreme Court held that the only limitation upon the power of Congress to levy excise taxes of the character under consideration was geographical uniformity throughout the United States; that the motives actuating the legislation could not be inquired into; and that as section 2 of the act aimed to confine the dispensing and sale to registered dealers and physicians, the court felt that the provisions thereof tended to diminish the opportunity of unauthorized persons to obtain drugs and sell them clandestinely without paying the tax imposed by the Federal law, and that said section therefore aided in the collection of the tax imposed.

Webb et al. v. United States (249 U. S. 96).

The main question in this case was whether the provisions of section 2 of the Harrison Narcotic Drug Act prohibited sales by druggists, registered under the act, to persons who have no physician's prescription, who are without the order blank, and who can not obtain such blank because not of the class to which such blanks are allowed to be issued; and if they did, whether they were constitutional. The court held that they did prohibit such sales, and were constitutional. It was further held that an order for a drug issued to an habitual user by a practicing and registered physician outside the course of professional treatment is not a physician's prescription.

Dillon v. Strathearn Steamship Co., Claimant of Steamship "Strathearn" (248 U. S. 182); Sandberg et al. v. McDonald, Claimant of the British Ship "Talus" (Id. 185); Neilson et al. v. Rhine Shipping Co., Claimant of the Sailing Ship "Rhine"; Hardy et al. v. Shepard & Morse Lumber Co., Claimant of the Barkentine "Windrush" (Id. 205).

These are known as the "Seamen's Act Cases." They involved the construction of certain provisions of the so-called seamen's act of March 4, 1915, which was passed in the interest of the American merchant marine and in order to curb the crimping evil. The Government filed a brief as *amicus curiae*. The questions varied somewhat in the different cases. In the *Strathearn* case a certificate by the circuit court of appeals was dismissed because of failure to state the facts, as required by rule 37 of the Supreme Court. In the *Talus* case the main question presented was that of the applicability of the act to advances to alien seamen shipping abroad on foreign vessels,

pursuant to contracts void under the foreign law. The court grounded its decision on the language of the act itself, which provided in section 10 that the section applied to foreign vessels only "while in the waters of the United States," and that as Congress had also made it an offense under said section to obtain from seamen seeking employment remuneration for so employing them, it could not be supposed that Congress intended to punish criminal acts done within a foreign jurisdiction. In the *Rhine* and *Windrush* cases the court stated that, although the advances were made by masters of American vessels in foreign ports, the interpretation of the statute which controlled in the *Talus* case was equally applicable, and that the act applied only to advances made in domestic ports.

United States v. Gudger (249 U. S. 373).

The sole question for decision was whether the provision of the Post Office appropriation act of 1917 known as the Reed amendment, which prohibits the transporting of liquor in interstate commerce "into" any State or Territory the laws of which prohibit its manufacture, etc., precludes its transportation "through" such a State to another. It was held that it does not, the word "into" having reference to the State of destination.

McKinley et al. v. United States (249 U. S. 397).

Plaintiffs in error were indicted for setting up a house of ill fame within the 5-mile zone prescribed by the Secretary of War in accordance with the provisions of the act of Congress of May 18, 1917, enacted to suppress houses of ill fame maintained near military stations. Plaintiffs in error contended that Congress had no constitutional authority to enact the provisions in question. The Supreme Court decided that, as Congress had the power to raise and support armies, it could make rules and regulations for the protection of their health and welfare; and further that it having adopted restrictions designed to guard the health of the men composing such armies, it could leave the details of the regulations to the head of an executive department and punish those who violate said restrictions.

United States v. Suda Reynolds (250 U. S. 104).

This was a suit brought by the United States in behalf of 11 heirs at law of Stella Washington, deceased, an absentee Shawnee, of Oklahoma, to cancel a deed made by Claudius Tyner, one of said heirs, to Suda Reynolds, conveying an undivided eleventh interest in a tract of land inherited from Stella Washington, the allottee thereof. The legal title to the tract was held by the United States under a certificate of allotment or "trust patent," dated February 6, 1892, declaring that pursuant to the act of Congress of February 8, 1887,

providing for such allotments, the United States should hold the land allotted in trust for the said Stella, and in case of her death for her heirs, the same not being subject to alienation by the beneficiaries, for a period of 25 years, at the expiration of which time the United States would convey the same to said Indian or her heirs in fee, discharged of the trust, unless the trust period had been extended by the President of the United States. Said trust period was extended by presidential proclamation made more than 25 years after the making of said allotments and their approval by the Secretary of the Interior, but less than 25 years from the date of the trust patent executed to the United States which declared said trust. The question was whether the 25-year period ran from approval of the allotment or the date of the trust patent. The Supreme Court decided that under said act the 25-year trust period, with the attendant restriction upon alienation, runs from the date of the trust patent, and not from the approval of the allotment, and an attempt to convey made by an heir of the allottee within the period so extended before its expiration is void, reversing the judgment of the United States circuit court of appeals holding otherwise. The case is the first express decision on this point and governs not only the construction of this act but also of other like acts.

Crocker et al., Trustees, v. Malley, Collector of Internal Revenue (249 U. S. 223).

This was an action to recover taxes paid under protest by Crocker et al. Petitioners were taxed as a joint-stock association within the meaning of the income-tax act of 1913, chapter 16, Section II-G. They insisted they were unincorporated trustees merely and subject only to the duties imposed upon fiduciaries by Section II-D. Certain mill property, preliminary to dissolution of a corporation, was conveyed to them in trust to convert same into money and distribute the net proceeds to persons holding certain trustees' receipt certificates, the time of distribution being left to their discretion, under certain limitations. They were to distribute the net income to the *cestui que trusts*, but were authorized to apply any funds in their hands for the repair or development of the property held by them or the acquisition of other property, pending conversion and distribution. Provision was made for compensation of the trustees which could not be changed without the consent of the beneficiaries, whose consent was necessary also to the filling of vacancies among the trustees and for modification of the terms of the trust. The real estate in question was under a long lease to a corporation in Massachusetts. The Supreme Court held that in no sense could the arrangement effected be determined a joint-stock association; that there was no provision for meeting among the various persons concerned; that the beneficiaries had no

joint action or interest or no control over the fund; that the trustees by themselves plainly could not constitute a joint-stock association, nor would the grouping of the two so result, and that the relation between the parties was that of trustee and *cestui que trust*, and the trustees were taxable only as fiduciaries.

Schenck v. United States; Baer v. United States (249 U. S. 47).

Schenck and Baer were indicted for (1) conspiracy to have printed and circulated to men called and accepted for military service under the selective-service act a document calculated to cause insubordination in the military and naval forces of the United States and to obstruct the recruiting and enlistment service when the country was at war, in violation of the espionage act of 1917; (2) conspiracy to use the mails for the transmission of matter declared to be nonmailable under Title XII of the espionage act; and (3) the unlawful use of the mails for the transmission of the matter above mentioned. The overt act alleged in pursuance of the conspiracies charged was the circulation of the document in question. Plaintiffs in error were found guilty on all counts of the indictment. The inadmissibility of certain evidence was alleged, which question was determined by the Supreme Court against the plaintiffs in error. The principal ground of alleged error was that the first amendment to the Constitution forbidding Congress to make any law abridging the freedom of speech or of the press had been violated. The Supreme Court decided that the document circulated was of an "obstructive nature"; that in time of war many things which might be said in time of peace are prohibited because of their hindrance to the Nation's effort; that in case of conspiracy it is not necessary that the act sought to be accomplished be actually successful if its tendency be to obstruct the activities of the United States during time of war; and, further, that the words in the act "obstruct the recruiting or enlistment service" embraced obstruction to the draft system as well as the volunteer system.

Frohwerk v. United States (250 U. S. 204).

Frohwerk was indicted for (1) conspiracy to violate the espionage act of 1917, section 3, the overt acts alleged being the preparation and circulation of certain articles in the Missouri Staats Zeitung; and (2) attempts to cause disloyalty, mutiny, and refusal of duty in the military and naval forces of the United States by the publications mentioned. Frohwerk was found guilty on all counts of the indictment except one. The contention was urged that the articles in question were protected by the first amendment to the Constitution guaranteeing freedom of speech and of the press. The Supreme Court, contrary to the contention urged, adopted its views in this respect an-

nounced in *Schenck and Baer v. United States* (249 U. S. 47), previously mentioned. It further held that the language of the pamphlet was of a nature calculated to obstruct the military operations of the Government. Plaintiffs in error also contended that the count alleging conspiracy was bad because it did not state the means by which the conspiracy was to be carried out. Held, that a conspiracy to obstruct recruiting would be criminal even if no means were agreed upon specifically by which to accomplish the intent.

Debs v. United States (249 U. S. 211).

Debs was convicted under counts of an indictment charging violation of the espionage act of 1917, as amended by the act of 1918, in that (1) he caused and attempted to cause insubordination, disloyalty, and mutiny in the military and naval forces of the United States, and with intent so to do delivered a public speech, etc., and (2) he obstructed and attempted to obstruct the recruiting and enlistment service of the United States, and to that end and with that intent delivered the speech above mentioned. Plaintiff in error contended in the Supreme Court that the speech was protected by the first constitutional amendment guaranteeing freedom of speech. The court declared this contention controlled by *Schenck and Baer v. United States* (249 U. S. 47). Also that the indictment was sufficient in form (*Frohwerk v. United States*, 249 U. S. 204). The remaining questions involved admission in evidence of the record of conviction of Ruthenberg et al. and of the antiwar proclamation and program of the Socialist Party adopted at St. Louis in April, 1917. Admission of the former evidence was upheld on the ground that, as the defendant in his speech purported to understand the grounds on which these persons were imprisoned, and condemned them, it was proper to show what these grounds were in order to explain the true import of his expression of sympathy and to throw light on the intent of his address. The admission of the latter evidence was upheld in view of the fact that Debs had expressed approval of the platform adopted (which counseled opposition to the war by any and all means); that it was relevant as to his meaning in using the words claimed to be used to obstruct recruiting.

United States v. Ferger et al. (259 U. S. 199); United States v. Ferger et al. (250 U. S. 207).

A demurrer was sustained to an indictment charging (1) forgery and the counterfeiting of bills of lading purporting to represent shipments of goods from Indiana to Ohio and the uttering of such bills of lading knowing them to be falsely made, etc., and (2) uttering of such bills of lading, and, with criminal intent, obtaining money thereon

from the Second National Bank of Chicago by using them as collateral. The question presented for decision was whether the court below erred in holding that the authority of Congress to regulate commerce did not embrace the power to forbid and punish fraudulent fabrication and use of fictitious interstate bills of lading. *United States v. Ferger* (250 U. S. 207) involved conspiracy to do the acts set forth above and the same question was presented for decision. The Supreme Court held that interstate bills of lading are instrumentalities of commerce, which Congress under its power to regulate commerce had authority to deal with; and that as Congress had the power to regulate and deal with such instrumentalities of commerce it had the right to enact legislation to guard them against the injury which would result from the making of spurious imitations thereof. The judgment of the court below was therefore reversed.

Rumely v. McCarthy, United States Marshal (250 U. S. 283).

This was an appeal from a final order of the District Court for the Southern District of New York dismissing writs of habeas corpus and certiorari sued out by appellant to determine the legality of his detention under a commitment issued by a United States commissioner to hold appellant in custody of the marshal pending the issuance of a warrant for his removal to the District of Columbia to answer an indictment for an alleged violation of the trading-with-the-enemy act of 1917. Indictments were also pending in the southern district of New York charging perjury in the making of reports to said Alien Property Custodian and of conspiracy to omit reporting certain property held on behalf of the German Government and of certain indebtedness thereto. Appellant contended that there was no probable cause to believe him guilty of the offense charged under the Washington indictment, because he could not be required to make report to the Alien Property Custodian of the facts alleged in the indictment since this would compel him in a criminal case to be a witness against himself, contrary to the provisions of the fifth amendment to the Constitution. The Supreme Court decided that appellant's constitutional point was a matter for defense at the trial; that the writ of habeas corpus could not be employed as an anticipatory writ of error; and that the question raised did not go to show want of probable cause. The commissioner found as a matter of fact that the Alien Property Custodian's office was located in the District of Columbia. The court, therefore, declared that the duty was imposed by statute to make report in the District of Columbia and that the failure to make it there was, if proved, an offense against the United States committed in that district. Appellant further contended that his removal to the District of Columbia invaded his constitutional right to a speedy trial on the New York indictment. The Supreme Court

held that on what indictment he should be tried first was a matter within the discretion of the Government. The final order was affirmed.

Blair et al. v. The United States (250 U. S. 273).

Plaintiffs in error and appellants were adjudged guilty of contempt of court because of their refusal to obey an order directing them to answer certain questions asked them before a Federal grand jury inquiring into supposed violations of section 125 of the Criminal Code (relating to perjury) and of the corrupt-practices act of June 25, 1910, in connection with the verification and filing in the Southern District of New York of reports to the Secretary of the Senate of the United States made by a candidate for nomination as Senator at a primary election held in Michigan. They refused to answer the questions propounded on the ground that they were of the opinion that the corrupt-practices act, as amended, was unconstitutional and void in so far as it attempted to regulate and control selection by political parties at primary elections of candidates for United States Senator to be voted for at the regular election; that the authority of Congress under the Constitution extended only to the definitive general election, and further that neither the United States district court nor the Federal grand jury had jurisdiction to inquire into such primary elections or to indict or try any person for an offense based upon the statute. The Supreme Court, in affirming the orders of the lower court, held that a witness is not interested to challenge the jurisdiction of the court or grand jury over the subject matter under inquiry; and that a witness is bound not only to attend the court or grand jury but to tell what he knows in answer to questions framed for the purpose of bringing out the truth of the matter under investigation, provided, of course, they do not tend to incriminate him.

Northern Pacific Railway Company et al. v. State of North Dakota on the Relation of Langer, Attorney General (250 U. S. 135).

This case arose out of the taking over of the railroads by the Government during the period of the war. The court below allowed a peremptory writ of mandamus commanding the Director General of Railroads and the officers of the Northern Pacific to desist from charging for transportation in intrastate business in North Dakota rates fixed by the United States. Further that the director general should thereafter exact for the service stated only the lesser rates fixed by the State utilities commission prior to the bringing of the suit, and which rates could not be changed without the approval of such commission. The Supreme Court held that complete possession and control of the railroads had been given the Government by virtue of the act of Congress of 1916, which authorized the President to take over said roads, the President's proclamation of 1917 in pursuance

thereof, and the act of 1918 dealing with compensation for the period of possession; that the power to make rates was plainly given the President by section 10 of the act of 1918, authorizing him to "initiate rates, fares," etc., by filing same with the Interstate Commerce Commission; that the statutes above mentioned were based upon the Government's war power; and that the Government, having exercised its authority in the premises, the power of the State must be subordinated thereto. The court disposed of the contention that the Government's power to initiate rates must be presumed to be limited to the character of rates which, under existing law, the Interstate Commerce Commission had power to consider—interstate rates—because the new rates when initiated were to be acted upon by that body, by asserting the express grant of power to the commission to consider the new rates in the light of the new and unified control which was created. The court also held that the provisions of section 15 of the act of 1918, designed to protect from the operation of the act local police regulations of the State, could not abridge the all-embracing power to initiate rates fixed by section 10. The decree of the Supreme Court of North Dakota was therefore reversed.

Dakota Central Telephone Company et al. v. State of South Dakota ex rel. Payne, Attorney General, et al. (250 U. S. 163); **Macleod et al., Constituting the Public Service Commission of Massachusetts, v. New England Telephone & Telegraph Company** (250 U. S. 185); **Burleson, Postmaster General, v. Dempcy et al., Constituting the Public Utilities Commission of Illinois, et al.** (250 U. S. 191); **State of Kansas v. Burleson, Postmaster General, et al.** (250 U. S. 188).

The above cases involved substantially the same question—the existence of State power to regulate without the consent of the United States telephone rates for business done wholly within the State over lines taken over during the war period by the United States and which were operated and controlled by it under its governmental authority. The Supreme Court decided that the same principle was involved as in the North Dakota case (250 U. S. 135) mentioned above, in which the authority of the State over intrastate rates in connection with railroads taken over by the Government was denied. It was contended that while complete possession and exclusive control, and the right to all revenues derived from the operation of the telephone lines, were in the United States, yet as to intrastate earnings the State power remained to "encumber" the authority of the United States, resulting from the reservation in general to the States of their lawful police regulations; also by reason of the fact that the subject of stocks and bonds was expressly withdrawn from State control, which would indicate that anything not expressly withdrawn from such control would be saved to it. In this connection the court held that the provision as to stocks and bonds was plainly

inserted to preserve the financial control of the United States over the companies, and further, that as full possession and control of the lines were vested in the Government, there would be nothing upon which the State power could be exercised.

THE ANTITRUST DIVISION.

(C. B. AMES, Assistant to the Attorney General.)

GENERAL STATEMENT.

As stated in the report of my predecessor last year, the activities of the department in the enforcement of the antitrust laws during the period of the war were necessarily curtailed in consequence of the direct intervention of the Government itself in industry, trade, and transportation through the creation of the Food, Fuel, and Railroad Administrations, the War Industries Board, and other extraordinary administrative agencies. With the exception of the Railroad Administration, these agencies are no longer maintained.

The department is now actively engaged in the investigation of a number of complaints of alleged violations of the antitrust laws. Among other things, an exhaustive investigation is being conducted with a view to ascertaining whether the prevailing high cost of living is brought about by agreement, combination, or monopolization by individuals or corporations engaged in interstate commerce. While the scope of this inquiry includes clothing and building materials, it is also directed against the meat packers, who, in addition to the meat business, have extended their operations to include butter, eggs, cheese, rice, and practically all kinds of canned goods. A special legal force has been organized and for several weeks has been engaged in pursuing this inquiry before a grand jury in session at Chicago, Ill.

During the past year 5 cases have been instituted under the antitrust laws—4 civil and 1 criminal; and 9 cases have been finally determined—4 civil and 5 criminal. There are pending at this time 30 cases—16 civil and 14 criminal.

The most important event of the year in relation to this subject was the dismissal by the Corn Products Refining Co., in March, 1919, of its appeal to the Supreme Court from the decree of the district court adjudging it a combination in restraint of trade in starch, glucose, and grape sugar, made from corn, and their derivatives, and in mixed sirups containing 85 per cent, or thereabouts, of glucose.

This action put into full force and effect the decree of the district court, which, after adjudging that the union of competitors on so large a scale through the instrumentality of the Corn Products Co. was a combination in restraint of trade, ordered the dissolution of the combination and enjoined it from further pursuing certain trade practices.

As a step toward compliance with the law, the company had already dispossessed itself by order of the district court of all its interest in the corporation of Penick & Ford (Ltd.), which was one of its principal competitors in sirups. By a further order, entered by the district court on March 31, 1919, the company was directed, with all possible diligence and in any event not later than January 1, 1921, to sell to entirely independent interests (a) its plant at Granite City, Ill., (b) its plant at Davenport, Iowa, (c) all its holdings in the National Starch Co., with plants at Oswego, N. Y., and (d) all its holdings in the Novelty Candy Co., which, according to the charge of the bill, it had used to coerce the patronage of candy manufacturers. This leaves the company with plants at Argo, Ill.; Pekin, Ill.; and Edgewater, N. J., only.

The decree further provided that if these properties shall not have been disposed of within the time specified, they are to be sold at public auction to the highest bidder, and that if at the expiration of three years the measures therein directed and those directed by the previous decrees in the case have not proved adequate in the opinion of the Government to restore competitive conditions in trade and commerce in starch, glucose, and grape sugar, made from corn and their derivatives, and in mixed sirups, and to bring about a situation in harmony with law, the Government shall have the right to such further relief in the present case as may be necessary to that end.

The group of cases pending in the Supreme Court, in which arguments have been deferred during the last two terms on account of conditions caused by the war, will be argued during the present term. Among the more important cases pending in the Supreme Court are those against the Reading Co., the Lehigh Valley Railroad Co. (the so-called Anthracite cases), and the United States Steel Corporation, which were argued early in October, and the Eastman Kodak Co., the American Can Co., and the Southern Pacific Co. The issues in these cases have been stated in previous reports.

CASES FINALLY DETERMINED.

ICE-CREAM CONE CASE.¹

The American Cone & Wafer Co. was charged in a petition filed against it in the northern district of Ohio on July 31, 1918, with entering into a combination to procure the adherence of jobbers to uniform resale prices for its product, commonly called ice-cream cones, by means of contracts and by refusing to make further sales to jobbers failing to adhere to such prices. The case was not contested and the practice complained of was enjoined in a decree entered on August 3, 1918.

¹ While this case was instituted and disposed of during the fiscal year covered by this report, it was also included in last year's report, as it arose before that report went to press.

CANTALOUPE EXCHANGE CASES.¹

The Western Cantaloupe Exchange and others were indicted in the northern district of Illinois in August, 1914, charged with having entered into a combination in restraint of interstate trade and commerce in cantaloupes raised in the Imperial Valley of California. The United States attorney reached the conclusion that the evidence in the case would not enable the Government to secure a conviction, and recommended that the indictment be dismissed and the desired relief sought through a bill in equity. This course was adopted, and on November 9, 1918, a decree was entered enjoining the defendants, among other things, from holding any membership or interest in the exchange and from taking any concerted action to limit or regulate competition between themselves and to enhance the price of cantaloupes in the markets of the United States.

CHICAGO LABOR UNION CASES.

Several indictments were returned in January and April, 1915, against certain so-called business agents of Chicago labor unions charging them with combining and conspiring to prevent the unloading in Chicago of goods shipped from other States. The trial of one case resulted in a verdict of guilty, and in December, 1918, the defendants were fined amounts aggregating \$2,500. The following March the remaining cases were disposed of on pleas of guilty and nolo contendere and fines aggregating \$2,000 were imposed.

KLAXON HORN CASE.

The form of contract which the Klaxon Co. required jobbers handling its warning signals or horns to enter into was the subject of a suit instituted in the district of New Jersey, in December, 1918. Among other things, the contract stipulated that the company would distribute its product through jobbers, selling to them at a certain discount from its published list prices, and the jobbers in turn agreed to resell at the prices fixed by the company. This resulted in the suppression of competition and the maintenance of uniform prices. The Klaxon Co. consented to the entry of a decree enjoining it from entering into any similar contract or agreement in the future.

JENSEN CREAMERY CASE.

The Jensen Creamery Co. and others were charged in an indictment returned in the district of Idaho, in February, 1917, with combining and conspiring to restrain and monopolize interstate trade

¹ While this case was instituted and disposed of during the fiscal year covered by this report, it was also included in last year's report, as it arose before that report went to press.

and commerce in creamery and dairy products in the Northwestern States. In February, 1919, the Jensen Co., the principal defendant, entered a plea of guilty and was fined \$7,500. The remaining defendants were acquitted.

AUTOMOBILE ACCESSORIES CASE.

The principal manufacturers and jobbers of automobile accessories in the United States entered into a combination through the instrumentality of the National Association of Automobile Accessory Jobbers, to control the entire trade in automobile accessories and eliminate all competition therein. The parties to this combination were indicted in the southern district of New York in August, 1917, a demurrer to the indictment was overruled in May, 1918, and after an extended trial the defendants were acquitted in February, 1919.

CORN PRODUCTS CASE.

The Corn Products Refining Co. in March, 1919, dismissed its appeal to the Supreme Court from the decree of the District Court for the Southern District of New York adjudging it a combination in restraint of trade and ordering its dissolution. This left the decree of the District Court as the final decree in the case and the parties agreed upon and the court entered an order to carry that decree into effect. (See ante, pp. 53-54.)

PHILADELPHIA TILE DEALERS CASE.

An indictment was returned in the eastern district of Pennsylvania in December, 1917, against Belfi et al., charging the defendants with combining and conspiring to prevent persons other than themselves and the concerns which they represent from engaging in business as retailers of tiles. Among other things, the defendants became officers and members of the Philadelphia Tile, Mantel & Grate Association; refused to admit as members concerns desiring to engage in the tile business in competition with them; refused to buy from manufacturers who sold to nonmember concerns; induced members of the Tile Layers' Union to threaten manufacturers to refuse to set their tiles if sold to nonmembers; and entered into an oral agreement and understanding with representatives of the Tile Layers' Union under which the latter were not to set tiles for nonmembers. On April 8, 1918, a verdict of guilty was returned against all of the defendants. The court granted a motion for a new trial as to 11 of the defendants and the Government dismissed the case as to them; the court imposed fines aggregating \$9,000 against the 10 remaining defendants and they appealed to the circuit court of appeals. The appeal was argued in November, 1918, and reargued in March, 1919.

In June, 1919, the judgment of the lower court was affirmed except as to two of the defendants. The final result of the case was eight convictions and fines aggregating \$8,000.

COLGATE CASE.

The Supreme Court in June, 1919, affirmed the judgment of the District Court for the Eastern District of Virginia sustaining a demurrer to an indictment returned in that district in December, 1917, against Colgate & Co. The indictment charged that the defendant indicated to wholesale and retail dealers by letters and circulars and orally the prices it desired to have maintained on its products and that dealers failing to maintain such prices were placed on so-called "suspended lists" and refused further supplies until they gave assurance that the prices indicated would be observed.

PENDING CASES INSTITUTED PRIOR TO JULY 1, 1918.

United States v. Reading Company et al.—(Anthracite Coal Combination.)—The decision of the district court in this case was favorable to the Government in substantial part, i. e., it was held that the union through a holding company of the Philadelphia & Reading Coal & Iron Co. and the Lehigh & Wilkes-Barre Coal Co.—two of the great anthracite coal-producing companies—is a combination in restraint of trade. In some important respects, however, the decision was adverse to the Government. Both the Government and the defendants appealed to the Supreme Court. The case was argued during the October term, 1916, and restored to the docket for reargument; it was reargued during the October term, 1917, and again restored to the docket for reargument; and it was postponed during the October term, 1918, on account of unsettled conditions caused by the war. Reargument was heard at the beginning of the October term, 1919, and a decision is awaited.

United States v. Lehigh Valley Railroad Co. et al.—The petition in this case charged that the Lehigh Valley Railroad, in combination with affiliated corporations, has monopolized trade and commerce in anthracite coal produced along and transported over its lines, in violation of the antitrust act; and that the same railroad is transporting in interstate commerce anthracite coal in which it has an interest, in violation of the commodity clause of the act to regulate commerce. The district court dismissed the petition, whereupon the Government appealed to the Supreme Court. The case was argued during the October term, 1916, and restored to the docket for reargument; it was reargued during the October term, 1917, and again restored to the docket for reargument; and it was postponed during the October term, 1918, on account of unsettled conditions caused

by the war. Reargument was heard at the beginning of the October term, 1919, and a decision is awaited.

United States v. United States Steel Corporation et al.—In conformity with the adverse decision of the circuit judges, sitting as a district court, a decree dismissing the Government's petition in this case was entered in September, 1915. The Government appealed to the Supreme Court and the case was argued in March, 1917. On May 21, 1917, it was restored to the docket for reargument. It was postponed during the October term, 1917 and 1918, on account of unsettled conditions caused by the war. Reargument was heard at the beginning of the October term, 1919, and a decision is awaited.

United States v. Eastman Kodak Company et al.—A decision favorable to the Government was handed down in August, 1915, and a decree granting the relief sought was entered in January, 1916. The defendants appealed to the Supreme Court. The hearing there has been postponed from time to time for reasons heretofore stated. The case is being prepared for argument during the present term of court.

United States v. American Can Company et al.—The District Court handed down an opinion in this case on February 23, 1916, and on July 7, 1916, a decree was entered adjudging that the American Can Co. was organized as a combination in restraint of trade. However, the only relief granted was the retention of the bill, i. e., keeping the combination under the supervision of the court. Considering that to be inadequate, the Government appealed to the Supreme Court. The hearing there has been postponed from time to time for reasons heretofore stated. The case is being prepared for argument during the present term of court.

United States v. Southern Pacific-Central Pacific Railway Company et al.—Under the provisions of the expediting act this case was argued before three circuit judges sitting as a district court. In an opinion filed March 9, 1917, this case was decided adversely to the Government, one judge dissenting. The Government appealed to the Supreme Court. The hearing there has been postponed from time to time because the properties of the defendants are being operated by the Government.

United States v. Quaker Oats Company et al.—This case was heard by three circuit judges under the expediting act. The decision of the majority was against the Government, one judge dissenting. The Government appealed to the Supreme Court. The hearing there has been postponed from time to time for reasons heretofore stated. The case is being prepared for argument during the present term of court.

United States v. Associated Billposters et al.—The defendants were charged with entering into a combination and conspiracy in restraint of trade and commerce in posters. A decision favorable to the Government was handed down in the district court in March, 1918, and

a decree granting the relief sought was entered in July, 1916. The defendants appealed to the Supreme Court. The hearing there has been postponed from time to time for reasons heretofore stated. The case is being prepared for argument during the present term of court.

United States v. Keystone Watch Case Company et al.—This case is pending in the Supreme Court on cross appeals from the decision of the lower court, which was in part favorable and in part adverse to the contentions of the Government. It is being prepared for argument during the present term of court.

United States v. American Sugar Refining Company et al.—This is a proceeding against an alleged combination in restraint of trade in the manufacture and sale of sugar. The case was ready for argument in October, 1915, when the court ordered that the hearing be postponed awaiting the decisions of the Supreme Court in the Harvester and Steel cases.

United States v. United Shoe Machinery Company et al.—This proceeding is pending in the eastern district of Missouri and involves the question whether the so-called tying clauses in a series of leases used by the defendants in the conduct of their business are violative of section 3 of the Clayton Act. Among other proceedings, a motion to dismiss the petition, involving largely the merits of the case, has been overruled. The taking of testimony has been completed and the case is ready for trial.

United States v. Michael Boyle et al.—These cases comprise two indictments, one against Boyle et al., and one against Feeney et al., and both charge a conspiracy between certain agents of labor unions and certain manufacturers in Chicago to prevent the installation in Chicago of electrical appliances and lighting fixtures manufactured elsewhere. The trial of the case against Boyle and others resulted in a verdict of guilty, and on March 22, 1917, the defendant, Boyle, was sentenced to one year in jail and fined \$5,000; one defendant was sentenced to 60 days in jail and fined \$500; and the remaining defendants were fined amounts aggregating \$13,000. All defendants appealed to the circuit court of appeals, which affirmed the judgment of the district court in April, 1919. The defendants made application for a rehearing, which was denied. In July, 1918, the court entered an order staying the mandate until further order by the court. The trial of the Feeney case is awaiting the outcome of the Boyle case.

United States v. Cowell et al.—District of Oregon. Indictment returned October 27, 1916, charging certain officers and agents of nine cement manufacturing companies with engaging in a combination to restrain, and with monopolizing, interstate trade and commerce in cement on the Pacific coast. Among other things the indictment alleged that the defendants apportioned territory and maintained

uniform prices. On April 30 and December 10, 1917, a majority of the defendants entered pleas of guilty and were fined amounts aggregating \$17,500. As to the remaining defendants the demurrers interposed by them were overruled and the case was tried in October, 1919. The jury after a conference of twelve hours was unable to agree upon a verdict.

United States v. Chicago Mosaic & Tiling Co. et al.—Northern District of Illinois. Indictment returned May 5, 1917, charging defendants, each a member or a representative of a member of the Chicago Mantel & Tile Contractors' Association, with combining and conspiring to restrain interstate trade and commerce in wall and floor tiles. Among other things, the defendants refused to deal with nonmembers, induced manufacturers to refuse to sell tiles to nonmembers, maintained uniform prices, etc. Demurrers overruled February 12, 1918. The case is now awaiting trial.

United States v. New England Fish Exchange et al.—District of Massachusetts. Petition filed June 21, 1917, charging defendants with combining to restrain and monopolize interstate commerce in the products of the New England fish industry. Among other things, it is alleged that practically all the fish brought in on the North Atlantic coast is marketed through the defendants, and that they have entered into agreements involving the fixing of maximum prices for buying and minimum prices for selling fish. The taking of testimony was completed in October, 1918, and an expediting certificate having been filed the case was tried before three judges in November, 1918. A decision favorable to the Government was handed down July, 1919, and pursuant thereto a preliminary decree ordering the dissolution of the combination was entered on September 13, 1919. The plan of dissolution is now under consideration.

United States v. M. Piowaty & Sons et al.—District of Massachusetts. Indictment returned May 24, 1917, charging defendants with combining through the instrumentality of the National Onion Association to control the onion crop and regulate the quantity placed on the market in such manner as to bring about a very substantial increase in price. On September 12, 1917, a demurrer was sustained as to the first count and overruled as to the second count. Five of the defendants subsequently entered pleas of *nolo contendere* and were fined amounts aggregating \$1,250. The case is awaiting trial as to the remaining defendants.

United States v. Gilman et al.—Northern District of Illinois. Indictment returned June 2, 1917, charging defendants, each a dealer in eggs and a member of the Chicago Butter & Egg Board, with purchasing large quantities of eggs as dealers and then concertedly adopting and following a practice of making fictitious trades among themselves on the board at prices higher than the true market prices,

thereby artificially enhancing the price of eggs throughout a large section of the country. Demurrer was overruled in February, 1918, and the case is awaiting trial.

United States v. Nash Brothers et al.—District of North Dakota. Indictment returned July 30, 1917, charging defendants with combining and conspiring to restrain and monopolize interstate trade in fruit in certain States in the Northwest. Among other things, the indictment charges that the defendants sought to prevent their competitors from purchasing fruit from growers and distributors, and cut prices to cause them to sustain losses in the sale of any fruit so purchased. A demurrer to this indictment was overruled in September, 1917, but on consideration of the opinion of the court it was deemed advisable to seek a new indictment. A new indictment was returned on February 27, 1918, and a demurrer thereto was overruled in March, 1919. The Government has appealed to the Supreme Court.

United States v. Ironite Co. et al.—Southern District of New York. Indictment returned May 10, 1918, charging defendants with conspiring to restrain and monopolize interstate trade in pulverized, powdered, or finely divided iron or other like metal or metal containing material used in or in connection with concrete construction work. Among other things, it is alleged that the defendants agreed among themselves to eliminate all competition and from time to time agreed to fix, establish, raise, and maintain uniform prices, discounts, terms of credit, and policies, and to limit the territory in which certain dealers might sell. This case is being prepared for early trial.

United States v. A. Schrader's Son (Inc.).—Northern District of Ohio. Indictment returned June 19, 1918, against A. Schrader's Son (Inc.), manufacturer of valves and valve parts, pneumatic pressure gauges, and various other accessories for use in connection with pneumatic tires on automobiles and other vehicles. The defendant is charged with requiring tire manufacturers and jobbers to whom it sells its products to execute uniform contracts concerning resales and with refusing to sell to those who do not enter into such contracts and adhere to the uniform resale prices fixed by it. In this way it is alleged competition was suppressed and prices to retail dealers and the consuming public were maintained and enhanced. Demurrer sustained in September, 1919. The Government has appealed to the Supreme Court.

United States v. Rockefeller et al.—(New Haven case).—The trial of 11 of the principal defendants in this case was begun in October, 1915, and on January 9, 1916, the jury acquitted 6 of the defendants and reported a disagreement as to the other 5.

United States v. Charles S. Mellen et al.—This indictment charges the defendants with conspiring to prevent the construction by or in

the interest of the Grand Trunk Railway Co. of certain lines of railroad in New England, thereby forestalling threatened competition with the New Haven system.

United States v. Simpson et al.—District of Columbia. Indictments returned in April, 1917, charging defendants with entering into an agreement as to the prices at which they would sell milk in the District of Columbia during the months of May to September, inclusive, 1916, and in pursuance of which uniform and increased prices were fixed and maintained.

United States v. Isaac Whiting et al.—(2 cases).—The indictments in these cases charge the defendants with conspiring to restrain and monopolize trade in milk throughout the New England States. Some of the defendants have entered pleas of *nolo contendere* and the case against them has been continued pending disposition of the case against the remaining defendants.

CASES INSTITUTED SINCE JULY 1, 1918.

United States v. The American Cone & Wafer Co.—(Ice Cream Cone case.)—Northern district of Ohio. Petition filed July 31, 1918. (See ante, p. 54.)

United States v. Sumatra Purchasing Corporation et al.—(Sumatra Leaf Tobacco case.)—Southern district of New York. Indictments returned October 7, 1918 (one under the Sherman Act and one under section 73 of the Wilson Tariff Act), charging the defendants with conspiring to control the entire trade and commerce in the purchase of Sumatra leaf tobacco in foreign countries and the importation of same into and the sale thereof throughout the United States, and to eliminate competition in and monopolize said trade and commerce, and to increase the price of said tobacco in the United States. This case is being prepared for early trial.

United States v. Western Cantaloupe Exchange et al.—Northern district of Illinois. Petition filed November 9, 1918. (See ante, p. 55.)

United States v. Klaxon Company.—District of New Jersey. Petition filed December 8, 1918. (See ante, p. 55.)

United States v. The Atlas Portland Cement Company et al.—Petition filed August 13, 1919, in the District Court, District of New Jersey, charging the defendants with combining and conspiring, through the instrumentality of the Cement Manufacturers' Protective Association, to curtail the production of cement, to reduce the quantity of cement sold under contract for future delivery at a fixed price, and to bring about a uniform and materially increased price for cement regardless of the point of delivery.

CASES UNDER THE ACT TO REGULATE COMMERCE.**1. UNDER THE COMMODITY CLAUSE.**

In the cases against the Lehigh Valley Co. and the Reading Co., under the Federal antitrust laws, referred to above, the defendants are also charged with transporting anthracite coal in which they have an interest in violation of the commodity clause.

The Lehigh Valley case was decided against the Government by the district court on the authority of the decision of the District Court for the Eastern District of Pennsylvania in the case of *United States v. Delaware, Lackawanna & Western R. R. Co. et al.* The latter case, however, has since been reversed by the Supreme Court. The Lehigh Valley case was appealed to the Supreme Court, was argued there in October, 1916, reargued in November, 1917, and in June, 1918, was again restored to the docket for reargument. It was reargued at the beginning of the October term, 1919, and a decision is awaited.

In the Reading case the decision, in so far as it related to alleged violations of the commodity clause, was also adverse to the Government. An appeal was taken to the Supreme Court, where the case was argued in October, 1916, reargued in November, 1917, and in June, 1918, was again restored to the docket for reargument. It was reargued at the beginning of the October term, 1919, and a decision is awaited.

2. REBATES AND UNLAWFUL DISCRIMINATIONS.

Since the last report 28 cases have been instituted and 63 concluded under the provisions of the act to regulate commerce and the so-called Elkins Act prohibiting the giving or receiving of rebates and discriminations. In the cases concluded, the courts imposed fines aggregating \$215,475.

BUREAU FOR DEFENSE OF CLAIMS AGAINST THE UNITED STATES.

(FRANK DAVIS, JR., Assistant Attorney General.)

By a long series of acts of Congress whereby the United States has submitted itself to suit, any citizen of the United States, or any citizen of a foreign country which allows Americans a reciprocal privilege, may sue the Government of the United States upon any debt, claim, or obligation of a contractual nature, and in respect of patent rights even where the basis of claim is not contractual but tortious. The Court of Claims has jurisdiction of claims "founded upon the Constitution of the United States or any law of Congress, upon any regulation of an executive department, upon any contract, express or implied, with the Government of the United States, or for damages, liquidated or unliquidated, in cases not sounding in tort, in respect of which claims the party would be entitled to redress against the United States either in a court of law, equity or admiralty if the United States were suable."

While the work of this bureau lies mainly in the Court of Claims at Washington, it also reaches into every district court of the United

States by virtue of the concurrent jurisdiction of the district courts in suits against the Government.

The policy of the United States in submitting itself to the suit of its citizens has gone far in many directions to relax customary legal procedure in order that poor claimants may be protected in their rights, even requiring that testimony shall be taken in the county of the residence of the witness, thus bringing the court to the witness rather than the witness to the court. This necessitates sending Government attorneys to all parts of the world.

Suits against the United States originate largely from the numerous contracts made by all departments of the Government. They grow out of the building of battleships, cruisers, and other vessels; the erection of public buildings; the dredging and improvement of rivers and harbors; the building and maintenance of dams, locks, and sea walls; the construction of dry docks; reclamation projects; contracts for Army supplies; contracts with mail contractors and railroad companies for carrying mails; claims for the alleged use and infringement of patented devices, and suits wherein it is contended that an implied contract exists.

A large amount of litigation involves the construction of statutes affecting the pay of the Army and Navy and civil employees of the Government; the reimbursement of disbursing officers for United States funds lost without negligence; cases referred to the court by special acts of Congress relating to dealings with the Indians; so-called cotton claims, filed under section 162 of the judicial act approved March 3, 1911; and numerous claims for property taken under the fifth amendment to the Constitution.

The volume of business before the Court of Claims will be greatly increased by the legislation broadening the powers of the Government in connection with the prosecution of the war. The adjustment of its resultant obligations will eventually bring a large number of suits involving vast sums of money into that court. The most prolific source of this litigation will be the sudden cancellation of contracts for supplies, materials, arms, equipment, buildings, and other public works following the signing of the armistice. It is impossible at this time to even estimate the probable volume of business that will arise therefrom, but some idea may be formed of its amount from the fact that in anticipation of the war and during its progress the Government entered into contracts involving billions of dollars.

In addition to formal contracts canceled by the Government, there were informal contracts and requisitions under the war defense act and other emergency legislation, validated by the act of March 2, 1919 (40 Stat., 1272), amounting to vast sums, in many of which claims have been presented to the Secretary of War as provided by said act with a right to sue in the Court of Claims if the claimants are dissatisfied with the award made by the Secretary.

The new internal-revenue legislation will also furnish a prolific source of litigation in the Court of Claims. Claims for the refund

of internal-revenue taxes filed with the Commissioner of Internal Revenue up to this time amount to many millions, a large percentage of which will unquestionably find their way into the Court of Claims. There will also be a vast number of what are known as Army and Navy pay cases.

The increase in litigation arising from the Civil War and the Spanish War will no doubt appear insignificant, both in volume and importance, as compared with that which will grow out of the World War, its magnitude being already indicated by the suits which have reached the Court of Claims and the district courts.

MISCELLANEOUS SUBJECTS.

The augmented activities in the Department of Justice by reason of the war have brought to this bureau an important class of business connected with contracts and claims which may be said to be allied to the defense of suits against the United States, as numerous controversies can ultimately be determined only by suits in the Court of Claims or district courts. Many of these involve the supervision of the defense of suits brought against Government contractors growing out of the execution of cost-plus contracts, wherein the United States has agreed to indemnify the contractor for all expenses and losses sustained in the execution of the contract. As a judgment against a contractor in this character of litigation may result in additional cost being charged against the contract, to be paid by the Government, it becomes the duty of this department to either defend such suits or to assist counsel for the contractors in the preparation of their defense.

There are also suits to be defended brought by individuals against officers of the Army to recover damages on account of personal injuries sustained as a result of collision with Army trucks, automobiles, and other Army equipment.

Another class of litigation wherein the department is requested to assist in the defense is that represented by suits against Government contractors brought upon contracts previously entered into with individuals and firms for the furnishing of supplies, etc., the contractor's output or plant being later commandeered by the Government, rendering the execution of the original contract impossible. The contractors in these instances contend that they should be held harmless from any judgments which may be rendered against them.

In the construction of public works for the United States Army a large number of personal-injury suits against the contractors and agents of the Government have arisen, aggregating several million dollars, that will also eventually find their way into the Court of Claims, or as claims against the Government in the district courts. To properly protect the Government's interests it is, therefore, necessary to render assistance in the original adjudication of these matters.

An additional class of business assigned to this bureau during the past year is the institution of suits in which the Government is the

party plaintiff. These are suits against defaulting Government contractors; for damages sustained by Government property, such as Army trucks, automobiles, etc., as the result of collision; actions to enjoin municipal authorities from taxing the property of the United States; suits brought at the instance of the Shipping Board for the value of hulls sold on the ways; advances made to Government contractors by the war credit board of the War Department; and suits to recover overpayments by the United States ranging all the way from excessive amounts paid to Government contractors through frauds practiced upon the United States under cost-plus contracts to overpayment of salaries to clerks dropped from Government rolls after the signing of the armistice.

LITIGATION ARISING OUT OF USE BY THE UNITED STATES OF PATENTED INVENTIONS.

The act of June 25, 1910, made the Government liable by suit in the Court of Claims "Whenever an invention * * * covered by a patent of the United States shall hereafter be used by the United States without license of the owner thereof or lawful right to use the same * * *."

The duty of defending suits brought under this law devolves upon this bureau, and the litigation had been steadily increasing even before the entrance of the United States into the war. In the prosecution of the war it became necessary for the Government to directly use many patented inventions, and also to let contracts so that it could immediately obtain articles the manufacture of which necessarily involves the use of patented inventions. This has resulted in claims being made directly against the United States by the owners of patents alleged to have been used. The amount of these claims is enormous. Those made against the Government on its claimed use of patented inventions in radio apparatus alone amount at this time to approximately \$50,000,000. Almost every department of the Government having to do with the production and use of supplies and equipment for the prosecution of the war, necessarily made use, directly or indirectly, of patented devices, so that the amount claimed on account of radio patents gives some idea of the situation existing in the entire patent field. The Supreme Court of the United States held in 1918 that manufacturers of apparatus required and used by the Government must account to the owner of any patent for infringement thereof by such manufacturers. Before this decision it had been the general understanding of manufacturers that they were not liable for infringement if the apparatus manufactured was for Government use, upon the theory that the liability of the Government to the owner of the patent, under the act of 1910, hereinbefore referred to, was his exclusive remedy. The law having been settled as to this, contractors who furnished apparatus covered by patents to the Government on its orders during the war are now being sued for infringement in the district courts throughout the

United States; the suit being directly between the owner of the patent and the contractor, the district courts have jurisdiction and the Court of Claims has not. The contractors claim that any judgment recovered against them for infringement of patents in manufacturing apparatus which they were required to manufacture and deliver to the Government must be paid by the Government, and that it is therefore the duty of the Government to defend these suits. The Government has been required to do this in some instances and probably will be required to do so in many.

The defense of patent suits involves a highly technical branch of the law, and constitutes a very difficult class of litigation. The litigation arising in this field is of great importance. It will occupy much of the time of the Court of Claims during the next few years and will largely increase the responsibilities and labors of this bureau.

After years of hard work on the part of the Court of Claims and of the Department of Justice the dockets of the court have been so cleared that not only pending suits but new business receive prompt attention, and cases are disposed of as rapidly as they are prepared and presented by counsel.

COURT OF CLAIMS.

Summary.

Total amount involved in cases disposed of during the year.....	\$27,076,414.15
Total amount awarded claimants.....	\$638,058.16
Total amount claimed in cases filed during the year.....	\$17,026,587.26
Contested cases disposed of during year.....	477
Number of cases dismissed for want of prosecution.....	419
Total number of cases disposed of.....	896
Total number of new cases filed.....	156
Total number of cases pending.....	544
Approximate amount involved in pending cases.....	\$48,052,021.04

GENERAL JURISDICTION CASES.

General jurisdiction cases are those in which claimants sue directly in the Court of Claims under the Judicial Code, and the court's judgments, subject to appeals to the Supreme Court, are final.

There are now pending in the Court of Claims 491 general jurisdiction cases.

Since the last report petitions have been filed in 152 cases, the amount claimed being, approximately, \$16,934,602.26.

During the year the court passed upon 874 cases, involving, as far as can be ascertained from the petitions, \$26,019,362.91.

In 772 cases, claiming \$24,665,963.97, judgments were in favor of the Government. In 102 cases, claiming \$1,699,176.89, there were awards in favor of claimants in the sum of \$637,999.81.

Of the cases decided in favor of the Government 205, claiming \$378,975.50, were dismissed under authority of the decision of the Supreme Court in the case of *James H. Cochnower v. The United States*.

Cases disposed of during year.....	874
Amount claimed in cases disposed of.....	\$26, 019, 362. 91
Amount recovered by claimants.....	\$637, 999. 81
Cases filed during the year.....	162
Approximate amount claimed in them.....	\$16, 934, 602. 26
Number of cases now pending.....	491
Approximate amount claimed in them.....	\$40, 840, 610. 33

CONGRESSIONAL CASES.

Congressional cases are before the court by reference of Congress under the acts of March 3, 1883, and March 3, 1887, commonly known as the Bowman and Tucker Acts, and authority of section 151 of the Judicial Code of March 3, 1911.

During the year the court disposed of 19 of these cases, involving a total of \$704,625.29, findings in which have been or will be reported to Congress.

One case was filed during the year, the amount claimed being \$75,000.

There are now pending 48 cases under this jurisdiction claiming, approximately, \$7,151,850.71.

INDIAN DEPREDAATION CASES.

Indian depredation cases arise under the jurisdictional act of March 3, 1891 (26 Stats., 851), and the amendatory act of January 11, 1915 (38 Stats., 391).

Since the date of the last annual report, at which time there were five cases still pending under the act of March 3, 1891 (26 Stats., 851), and as amended January 11, 1915 (38 Stats., 791), three cases involving a total amount claimed of \$16,985 have been reinstated. Three cases have been tried during the year, in two of which involving \$6,650 the defendants were successful and the petitions dismissed, and in the third a judgment in favor of the claimant for \$300 was awarded. Of the five cases now pending, involving \$49,560, three are or will be ready for trial when the court convenes in October; and, unless the claimants in the remaining two cases are ready to proceed by that time, it is my intention to move to dismiss for nonprosecution.

In addition to the above the claimants in six other cases, involving a total amount claimed of \$42,315, were unsuccessful in their efforts to have the petitions reinstated.

The appeal to the Supreme Court taken by the plaintiff in *Rex, Administratrix, v. The United States et al.*, No. 10842, has not yet been passed upon by that court.

APPEALS TO THE SUPREME COURT FROM THE COURT OF CLAIMS.

During the year 31 cases appealed from the Court of Claims were presented to the Supreme Court, 8 of which were appealed by the United States and 23 by the plaintiffs. Decisions in 15 of these cases were in favor of the Government and 8 against it. The remaining 8 cases have not been decided. In addition motions to remand filed by plaintiffs in 3 cases were opposed by the United States. In 1 case the application was allowed, denied in 1, and in 1 decision has not been rendered.

There are now pending in the Supreme Court 55 appeals from the Court of Claims, 49 of which were taken by plaintiffs and 6 by the United States.

UNITED STATES DISTRICT COURTS.

This bureau is charged with the general supervision of the defense of suits brought against the Government in the various district courts of the United States under the act entitled "An act to provide for the bringing of suits against the Government of the United States" (1 Supp. R. S., 559), as amended by the Judicial Code of March 3, 1911 (38 Stats. L., 1087), as also those suits brought against the United States pursuant to the provisions of various statutes enacted subsequent to the declaration of war which authorize the President to commandeer, requisition, and otherwise take over or control real estate and personal property essential for the maintenance of the Army and Navy in furtherance of the national security and defense. During the year 54 suits were brought in the district courts throughout the United States, involving in the aggregate the sum of \$102,546.09. This is an increase of 43 suits over the previous year.

Under this jurisdiction six cases went to judgment against the United States during the year. In satisfaction of these, Congress, at its last session, appropriated the sum of \$96,362.68, and in satisfaction of three judgments rendered in prior years the sum of \$9,336.10. One case was dismissed and six stand on error to the Supreme Court.

Since the jurisdiction was created 1,769 suits have been brought against the Government, of which 112 are now pending in the district courts.

The foregoing shows a considerable increase over previous years of suits filed in the United States district courts under this jurisdiction.

CRIMINAL DIVISION.

(R. P. STEWART, Assistant Attorney General.)

The present division of the work of the department assigns to this division all criminal matters arising under Federal laws except prosecutions under the food bill, the antitrust act, and violations of the war-time prohibition bill (act of Nov. 21, 1918). In common with the other branches of the department, the work of this division has been greatly increased during the past fiscal year, notwithstanding the lessening of criminal activities growing out of war conditions. The Bureau of Investigation, although independent in organization, by reason of its necessary duties regarding the prosecution and detection of crimes, is at all times in close cooperation with this branch. The work of the two divisions is now so coordinated that satisfactory results will continue to be shown as a result thereof. In addition, this division advises and directs the criminal work of the several United States attorneys, both as to substantive law and procedure, thus establishing a relation of an intimate character of great service to the administration of justice. The following brief

survey of the more important classes of criminal work handled by this division indicates the character of the matters disposed of by it. The total number of criminal cases of all classes, commenced under the direction of this division during the fiscal year, was 47,443, with fines imposed amounting in the aggregate to \$5,632,759, of which there was collected \$1,917,838.29; the number of acquittals was 2,000, and cases dismissed and nol-prossed amounted to 7,954.

CASES ARISING UNDER THE POSTAL LAWS.

Among the more important cases arising under the above laws, attention is invited to the following:

The McAlester Real Estate Exchange and certain of its principal officers were indicted upon the charge of using the mails in furtherance of a scheme to defraud. Their scheme consisted, dominantly, in soliciting persons to employ the company to act as agents for them at alleged auction sales of Indian lands by the Government. In addition to using the mails, they operated a number of cars over the railroads of the country, which cars would be placed upon the side-tracks in various cities, and the local citizens invited to visit the cars and inspect the products of the alleged Indian lands. Through what may be termed "advertising talk" by agents of the company in charge of the cars a large number of persons were induced to employ the company and pay fees for such service. The lands that the purchaser in many instances ultimately received were, in no fair sense, such land as he had been led to believe he would secure. The operations of the company were not only widespread but highly successful. Sixteen of the defendants were convicted, receiving penitentiary and jail sentences.

Albert Le More and Edward E. Carriere were convicted upon the charge of using the mails in furtherance of a scheme to defraud. They had been dealers in staves and as a result of their legitimate carrying on of that business were enabled to subsequently adopt the practice of collecting on bills of lading which had been fraudulently procured by them from the transportation companies, the defendants never having furnished the companies with the staves and never intended to. Large sums of money were, through the fraudulent scheme, lost by those induced to purchase or negotiate the bills of lading. The circuit court of appeals affirmed the conviction, and the Supreme Court of the United States refused to review the case on writ of certiorari.

John J. Shea, convicted of two similar offenses, employed the scheme of inducing persons of wealth to bet large sums of money on so-called fake horse races. His scheme was quite successful. His conviction was also upheld by the circuit court of appeals and further review on writ of certiorari refused by the Supreme Court of the United States.

James Dorsey, also convicted of a similar offense, employed the scheme of selling as high-class, thoroughbred, tuberculin-tested cattle, cattle of common breeding and not tuberculin tested. His conviction was also upheld by the circuit court of appeals and further review on certiorari denied by the Supreme Court of the United States.

W. F. Hallowell, also convicted of a similar offense, adopted the scheme of inducing persons to pay him large sums of money to procure for them tracts of land comprised within the much-litigated Oregon-California grant. Of course the purchasers, under the conditions represented by Hallowell, never could lawfully obtain title to the land, and they thus lost all they paid him for his alleged services in the matter. His conviction was also upheld by the circuit court of appeals and further review refused by the Supreme Court of the United States.

Frederick H. and Henry F. Clarke were convicted of a similar offense. Their scheme was a stock-selling one in an alleged automobile concern, viz, the Kent Motors Corporation. Their conviction was upheld by the circuit court of appeals and further review refused by the Supreme Court of the United States.

James Kenney was convicted upon the charge of submitting false reports of cancellations of postage stamps while a postmaster, for the purpose of increasing his compensation, thus working a fraud upon the United States. His conviction was upheld by the circuit court of appeals and further review refused by the Supreme Court of the United States.

After the conviction of the Standard Home Co. upon the charge of using the mails to defraud, and the imposition of a fine upon the company, the company went into bankruptcy without paying the fine or costs of the prosecution. In the bankruptcy proceedings the Government filed a claim for said fine and costs. The bankruptcy court held that the United States was not entitled to priority of payment, but the circuit court of appeals upheld the right of the United States to recover the costs, viz, \$9,000, as a priority claim, but not the fine. The trustee in bankruptcy is making an effort to procure a further review by the Supreme Court on writ of certiorari.

An indictment has been returned at Chicago, Ill., charging Samuel G. Pandolfo and the Pan Motor Co. with using the mails in furtherance of a scheme to defraud in the sale of stock to the public on an enormous scale. The case is being prepared for trial, which it is now expected will take place during the month of October.

The total number of cases under this head commenced during the fiscal year were 2,092, of which number there were 1,463 convictions, and fines imposed to the amount of \$296,436.57.

ILLICIT DISTILLING.

During the past year the number of cases involving illicit distilling has in certain districts increased to a degree which has in some instances overtaxed the office of United States attorney and caused serious congestion in the court's criminal calendar. While in a few instances it has seemed advisable to recommend acceptance of offers submitted in compromise of this offense, generally speaking in the prosecution of cases of this character no effort has been spared to secure the conviction of the guilty parties, the result of which, it is hoped, will have a wholesome and deterrent effect upon such offenders.

The total number of criminal prosecutions under the internal-revenue laws, including illicit distilling cases, commenced during the fiscal year ending June 30, 1919, is 5,807. There have been 2,590 convictions under this head. The aggregate amount of fines, forfeitures, and penalties on account thereof imposed during that period is \$545,926.13.

MISCELLANEOUS CRIMINAL PROSECUTIONS.

For the fiscal year there have been commenced miscellaneous criminal prosecutions in addition to the other classifications set forth herein to the number of 19,126. There have been 12,166 convictions, and the fines, forfeitures, and penalties imposed in such cases during that period amount in the aggregate to \$1,049,119.83.

INVESTIGATION OF WAR FRAUD MATTERS.

During the present year this division has had referred to it and has conducted, through the Bureau of Investigation, a large number of investigations of cases growing out of shipyard and munition plant contracts. Up to the present writing 25 shipyard and munition plant cases involving alleged fraud are being investigated. Many of the above-mentioned cases involve alleged misapplication of millions of dollars. In view of the fact that a number of these cases necessitate undercover investigations, it is not thought advisable to mention the specific cases by name.

Complaints charging irregularities in shipyards and munition plants are continually coming in and are being handled as rapidly as the facilities of the Bureau of Investigation will permit. Because of the tediousness and great length of time required to make these investigations, few of them have been as yet completed.

During the past year there have been reported to this division by the Treasury Department approximately 5,000 cases of alleged fraud under the War Risk Insurance Act. These cases are being investigated, and in a number of instances we have been able to uncover fraud before actual payment of money by the Treasury Department, and in many other cases have been able to recover checks before they had been made use of. Five hundred of these cases have been fully investigated and records thereof sent to the various United States attorneys for prosecution.

ENFORCEMENT OF THE WHITE-SLAVE TRAFFIC ACT.

During the past fiscal year there have been 261 convictions under the white-slave traffic act, 19 acquittals, 80 cases nolle-prossed, and there were 494 cases pending at the close of said fiscal year. The imprisonment imposed aggregates 332 years, 2 months and 10 days, and the total amount of fines imposed totals \$35,002. These figures show a decrease of 91 convictions, a decrease of 21 acquittals, and a decrease of 56 cases nolle-prossed. There has also been a marked decrease in the number of indictments returned covering this offense.

The decrease in the number of indictments returned and convictions secured is attributable mainly to the fact that this class of prosecutions has, during the greater part of this last year, necessarily had to await prosecution of cases growing out of offenses against the war statutes, which undoubtedly required more immediate and careful attention. The above statement is further substantiated by a reference to the fact that at the end of the past fiscal year there were pending 494 cases, or an increase of 83 more cases pending than at the end of the fiscal year 1918.

The total number of convictions under this act, from the date of its passage up to the end of this fiscal year, were 2,459; acquittals, 342; and cases nolle-prossed, 532. The imprisonment imposed has aggregated 3,591 years, 3 months and 11 days; and the fines, \$249,672.63.

VIOLATIONS OF NATIONAL BANKING LAWS.

During the fiscal year ending June 30, 1919, 189 cases of alleged violations of the banking laws of the United States were reported to the department for investigation. Thirty-five cases of this character, embracing 39 defendants, were brought to trial during the same period, resulting in the conviction of 32 persons and 7 acquittals. During the previous year 48 cases involving 52 defendants were tried, 45 of these defendants being convicted and 7 acquitted.

INTERNAL REVENUE, TAX, PROHIBITION, AND MISCELLANEOUS MATTERS DIVISION.

(WILLIAM L. FRIERSON, Assistant Attorney General.)

LIQUOR LAWS.

Numerous cases were prosecuted in the district courts for violation of the law known as the Reed amendment, which prohibits the shipment of intoxicating liquors into dry States, as well as under section 240 of the Penal Code, regulating the shipment of liquor in interstate commerce. Two cases under the Reed amendment reached the Supreme Court during the year. One was decided in favor of the Government's contention that the transportation of liquor into a State whose laws prohibited the sale or manufacture of liquor for beverage purposes is unlawful, even though the laws of the State permit such liquor in limited quantities to be brought in for personal use. In the other the decision was against the Government's contention, which was that the Reed amendment prohibited the transportation of liquor into a State the laws of which prohibited its manufacture or sale for beverage purposes even though it be carried into the State only for the purpose of being transported through to another State in which the sale or manufacture is not prohibited.

The war prohibition act of November 21, 1918, prohibiting the use of fruit and food products in the manufacture of beer, wine, or other intoxicating malt or vinous liquors for beverage purposes, went into effect as to the manufacture on May 1, 1919. The provision of the act against the sale of liquors did not go into effect until July 1, 1919,

and therefore was not in effect during the year for which this report is made. Prior to May 1, manufacturers of beer commenced an action in the District Court for the Southern District of New York against the United States district attorney and the collector of internal revenue seeking to enjoin the enforcement of the law upon the ground that the act was unconstitutional, or, if not unconstitutional, that it did not prohibit the manufacture of beer unless such beer was in fact intoxicating, it being alleged that beer containing not more than $2\frac{3}{4}$ per cent of alcohol was not in fact intoxicating. This suit was earnestly resisted upon the ground that the act was constitutional and prohibited the manufacture of beer regardless of the amount of alcohol it contained and made it unnecessary for the Government to prove in any case as a matter of fact that the beer in question was intoxicating. The district judge held that the act was constitutional, but, being of opinion that under its terms the Government must prove in each case that the beer was intoxicating, granted a preliminary injunction restraining the district attorney from commencing prosecutions for the manufacture of beer containing not more than $2\frac{3}{4}$ per cent of alcohol. The circuit court of appeals, however, reversed the decree granting the injunction against the district attorney, holding that the act was constitutional and that the court was without jurisdiction to enjoin the district attorney from commencing prosecutions under a constitutional act of Congress upon the allegation that he was misconstruing the act.

SAFETY-APPLIANCE ACTS.

During the fiscal year 15 cases, involving 73 counts, were transmitted to the several United States attorneys for prosecution. Cases aggregating 57 counts were tried, of which 49 counts were decided in favor of and 8 counts adversely to the Government, and 1 count pending in a district court from last year having been decided in favor of the Government, making a total of 58 counts decided during the year. There were 273 counts confessed and 81 dismissed. There were 24 counts pending on appeal in the circuit courts of appeals at the beginning of the fiscal year, 14 of which were appealed by the Government and 10 by a carrier, all of which were decided in favor of the Government excepting 2 counts, which are now before the Supreme Court. During this year there were but 4 counts appealed, this action being taken by one of the carriers on the retrial of the case. There are now pending in the various district courts 70 cases involving 215 counts.

HOURS-OF-SERVICE ACT.

During the fiscal year there were transmitted to the several United States attorneys for prosecution 10 cases, involving 61 counts. Cases aggregating 21 counts were tried, of which 2 counts are pending

decision, 2 counts were decided in favor of and 17 adversely to the Government, of which 17 counts 16 have been appealed. There were also 42 counts decided against the Government on demurrers to defendants' answers. There were 461 counts confessed and 46 counts dismissed. In the various circuit courts of appeals there were decisions in 3 cases involving 23 counts, all of which were decided in favor of the Government. In 2 cases decided by the Supreme Court involving 29 counts, the decisions were in favor of the Government, and certiorari was denied in 2 cases, involving 120 counts, wherein the decision of the Circuit Court of Appeals was favorable to the Government. Pending trial in the various district courts are 71 cases involving 651 counts.

ASH-PAN ACT.

There were no violations of this act reported to the United States attorneys during the past year, and there are no cases now pending.

TWENTY-EIGHT-HOUR LAW.

During the year penalties aggregating \$109,850 were recovered for 849 violations of this act. Cases involving 20 violations were determined adversely to the Government, and there were dismissals by the Government as to 112 counts. There are now pending in the district courts cases involving 2,037 counts. During the year there were transmitted to the United States attorneys for prosecution charges and preliminary proofs of 1,711 violations.

FOOD AND DRUGS ACT.

During the year 1,588 cases were transmitted to the United States attorneys, 413 of which were criminal and 1,175 civil. The 413 criminal cases embraced 860 alleged violations of the food and drugs act.

At the close of the fiscal year 1918 there were pending 398 cases, of which 188 were criminal prosecutions and 210 were seizures.

Two hundred and fifty-four cases pending at the close of the fiscal year 1918, and 765 reported during the fiscal year 1919, in all 1,019, were terminated in 1919. Of those terminated, 271 were criminal and 748 were civil.

In 244 of the 271 criminal cases fines were imposed amounting to \$18,160. Most of these cases were disposed of by pleas of guilty or nolo contendere. There were trials in only 2 resulting in convictions and 1 of these is now pending on appeal; in 6 collateral deposited by defendants was forfeited by reason of their nonappearance in court. In 1 the judgment of conviction in the lower court was reversed by the circuit court of appeals; in 3 there were acquittals; 22

were nolle prossed or the information dismissed; and 1 was withdrawn from prosecution.

Of the 748 civil cases terminated during the year decrees of condemnation and forfeiture or informal orders for the disposition of the property were entered in 667, of which 5 were decided favorably to the Government after contest; in 30 the libels were dismissed; in 44 the packages were broken or disposed of before seizure could be made; and in 7 verdicts were returned for the claimant after trial to the court and a jury. In the 667 cases in which decrees of condemnation and forfeiture were entered the goods were destroyed in 340; released on bond or otherwise in 266; and sold in 61. In many of the cases in which the product was ordered released or sold, the decree of the court provided that the product should be sorted and that that portion found unfit for food should be destroyed.

At the close of the year 967 cases were pending, of which 330 were criminal prosecutions and 637 were seizures.

INSECTICIDE AND FUNGICIDE ACT.

Cases charging 89 violations of this act were terminated during the year, 83 of which were criminal and 6 civil. Fines were imposed in 69 cases, amounting to \$2,342. There are now pending prosecutions for 95 violations, 87 of which are criminal and 8 civil. During the year 104 cases were transmitted to the United States attorneys, 90 of which were criminal and 14 civil.

MEAT INSPECTION ACT.

Fines aggregating \$1,306 were imposed for 27 violations of this act. Cases involving 10 violations were dismissed, 2 nolle prossed, and in 4 cases grand juries refused to find a "true bill." There were pending at the close of the year cases involving 31 violations. During the year there were reported to the United States attorneys 26 alleged violations.

ANIMAL QUARANTINE ACT.

Three hundred and thirty-four cases were terminated during the year, 269 resulting in convictions and fines aggregating \$27,000. In 65 cases a nolle prosequi was entered, and in 2 cases the grand juries failed to indict. Twenty-seven alleged violations were reported to the United States attorneys during the year and 150 alleged violations were referred to the Director General of Railroads for appropriate action, 66 of which had been given consideration by him at the close of the year.

PLANT QUARANTINE ACT.

Four cases were reported to the United States attorneys during the year. At the close of the fiscal year 1918 there were 14 cases pending. Three cases which were closed prior to the beginning of the fiscal year 1918 were not reported to this office until too late for their inclusion in the annual report. Of the four new cases, one was withdrawn upon the request of the Federal Horticultural Board; one other case was nolle prossed. There are now 15 cases pending.

VIRUS ACT.

At the beginning of this year there were three cases pending under this act, and during the year one additional case was reported, all of which were pending at the close of the year.

LACEY ACT.

Twenty-three cases under this act were terminated during the year, with convictions in 17 cases and fines aggregating \$1,917. Twenty-nine cases were pending at the close of the year. Twenty-six alleged violations of this act were reported during the year to the United States attorneys.

MIGRATORY BIRD TREATY ACT.

The treaty with Great Britain for the protection of migratory birds was proclaimed by the President December 8, 1916. On July 3, 1918, the President approved the act of Congress to carry the treaty into effect, and on July 31, 1918, approved and proclaimed the regulations adopted by the Secretary of Agriculture to give effect to the act. Since this time 296 cases have been reported to the United States attorneys for prosecution, and convictions and the imposition of fines aggregating \$2,230 have been secured in 110 of these cases. There have been no adverse decisions.

BIRD RESERVATION TRESPASS.

Six cases were reported to the United States attorneys during the year. At the close of the preceding fiscal year 17 cases were pending, of which 6 were closed during this fiscal year, 5 by convictions and the imposition of fines amounting to \$315, and 1 by trial to the jury and a verdict of not guilty. Of the 6 cases reported during the year 1 was closed, a jury trial resulting in the acquittal of the defendant. Sixteen cases were pending at the close of the year.

KILLING OF GAME IN NATIONAL FORESTS.

In the 53 cases instituted on account of hunting or killing of game animals in the national forests in violation of the rules and regulations, 34 defendants were found guilty and fined, and sentences ag-

gregating 55 days in jail were imposed; 3 were dismissed because defendants were out of the State; 2 defendants were found not guilty; 1 case was dismissed for lack of evidence; 2 were continued; 2 were dismissed; and 9 are awaiting trial.

CASES ARISING OUT OF ORDERS OF THE INTERSTATE COMMERCE COMMISSION.

Eastern Texas Railroad Co. v. Railroad Commission of Texas, western district of Texas, is a suit in which by a cross bill the Railroad Commission of Texas sought an injunction against an order of the Interstate Commerce Commission in what is known as the "Shreveport case." (234 U. S. 342.) The district court denied the motion of the railroad commission for interlocutory injunction against the order and granted the motion of the carriers for interlocutory injunction to prevent the railroad commission from interfering with them in their acts in complying with the order. (242 Fed. Rep. 300.) The case was referred to a special master. He took testimony and found that the order was entered before the commission on the petition of the Railroad Commission of Louisiana, and that jurisdiction did not lie in the western district of Texas on the cross bill of the Railroad Commission of Texas to enjoin it. Exceptions were filed by the attorney general of Texas to that report and the case is fixed for hearing at the January term, 1920.

Seaboard Air Line Railway Co. v. United States, eastern district of Virginia, is a suit to set aside an order of the commission which directed certain trunk-line carriers to cease and desist from practicing the discrimination of absorbing or nonabsorbing switching charges on traffic delivered to industries, the only distinction being that of competitive conditions existing at the points where the traffic originated. The district court denied application for interlocutory injunction and dismissed the petition. (249 Fed. Rep. 368.) The carriers appealed to the Supreme Court where the case is now pending.

Chestnut Ridge Railway Co. v. United States, middle district of Pennsylvania, is a suit to enjoin an order fixing divisions between the petitioner and the trunk lines. On hearing and after opinion of the district court, the case was reopened and continued for additional record which has been supplied. The case is now awaiting final decision.

The National Tube Co. v. United States, northern district of Ohio, was a suit to set aside the order of the commission directing the trunk line carriers to cease and desist from paying switching allowances to the Lake Terminal Railroad Co., which serves the plants of the National Tube Co. and Carnegie Steel Co., the three companies named being subsidiaries of United States Steel Corporation. On hearing, September 17, 1918, on application for interlocutory in-

junction, the court held that the question of the reasonableness of the allowances was not fairly in issue in the hearing before the commission and that the parties had not had full opportunity to be heard on that subject. Accordingly, without going into the merits of the case, the order of the commission was enjoined. Subsequently, the commission, on its own motion, struck off the order and refixed the case for hearing before the commission. Thereupon the court dismissed the petition on the ground that the case had become moot. The question is still pending before the commission.

Alaska Steamship Co. et al v. United States, southern district of New York. On April 14, 1919, the Interstate Commerce Commission issued an order prescribing uniform bills of lading for adoption by the various railroad and steamship companies operating within the jurisdiction of the commission. (52 U. C. C. 671.) Numerous railroad and coastwise steamship companies filed a petition to annul and enjoin the order, alleging, first, that the commission had no power or authority to prescribe the forms of the bills of lading; and, second, that if it had such power or authority, it had exercised it arbitrarily. On July 3, 1919, on application for interlocutory injunction, the court enjoined the order of the commission, solely on the first ground with a full opinion, one judge dissenting. An appeal was taken to the Supreme Court of the United States where the case is now pending.

PUBLIC LANDS DIVISION.

(FRANK K. NEBEKER, Assistant Attorney General.)

ENFORCEMENT OF THE PUBLIC AND INDIAN LAND LAWS.

On June 30, 1918, there were pending in the trial courts 360 civil and 62 criminal cases¹ affecting public lands. During the year ended June 30, 1919, 126 civil and 57 criminal cases were instituted and 177 civil and 68 criminal cases were disposed of, leaving 309 civil and 51 criminal cases pending June 30, 1919. Of the civil cases terminated, 106 were decided in favor of the Government, 31 were compromised, 22 were lost, and 18 were discontinued. In the criminal cases, 44 defendants were convicted or pleaded guilty, 34 were discharged on orders of nolle prosequi, and 12 were discharged by acquittal. Damages were recovered during the year in the sum of \$201,235.45 and \$5,986.88 in fines imposed. Title to 67,310 acres

¹ In the following pages relating to litigation over public and Indian lands the term "case" is used to designate a single legal proceeding (which may involve one or several distinct transactions), with this exception: Many of the proceedings referred to under the head "Suits to cancel unlawful conveyances of Indian allotments, Five Civilized Tribes," involve large numbers of conveyances and defendants claiming thereunder. The proceedings are in course of being disposed of in parts, and, therefore, as a matter of convenience in referring to them, the word "case" is used to indicate the individual transaction rather than the suit in which it has become involved.

of land was recovered, and unlawful inclosures of 12,510 acres of public land were abated. (See Exhibit 17.)

At the beginning of the fiscal year 1919 there were 40 cases involving public lands pending in the circuit courts of appeals and 12 were docketed in those courts and 16 disposed of during the year, leaving 36 pending on June 30, 1919. The Government won 11 of the cases disposed of and lost 5. There was also pending at the beginning of the year in the Court of Appeals of the District of Columbia 1 public-land case. Nine cases were docketed and 5 disposed of—4 in favor of the Government and 1 adversely to it—in that court during the year leaving 5 cases pending on June 30, 1919.

In the Supreme Court of the United States there were pending on June 30, 1918, 12 cases involving public lands, and during the year ended June 30, 1919, 7 additional cases were docketed and 7 decided—all in favor of the United States—leaving 12 pending in the Supreme Court on June 30, 1919.

On June 30, 1918, there were pending in the trial courts 1,181 civil and 11 criminal cases involving Indian lands. During the year ended June 30, 1919, 173 civil and 18 criminal cases were begun and 515 civil and 8 criminal cases terminated, leaving 839 civil and 21 criminal cases pending on June 30, 1919. Of the civil cases disposed of 249 were terminated favorably to the Government, 34 adversely, 134 were compromised, and 98 were discontinued. In the criminal cases 7 defendants were convicted or pleaded guilty, 3 were discharged on orders of nolle prosequi, and 2 were discharged by acquittal.

There were 16 cases involving Indian lands pending in the United States circuit courts of appeals on June 30, 1918, and 14 were docketed and 15 terminated in those courts during the fiscal year 1919, leaving 15 pending on June 30, 1919. Of the cases terminated 11 were in favor of and 4 adverse to the United States. There were also pending on June 30, 1918, in the Court of Appeals of the District of Columbia 7 cases affecting Indian lands and 3 such cases were docketed and 3 disposed of during the fiscal year 1919—all in favor of the Government—leaving 7 cases pending on June 30, 1919.

In the Supreme Court of the United States there were pending on June 30, 1918, 8 cases affecting Indian lands. During the year ended June 30, 1919, 6 such cases were docketed in that court and 7 disposed of—all in favor of the Government—leaving 7 cases pending on June 30, 1919.

More detailed reports as to certain of the more important litigation follow.

OREGON AND CALIFORNIA RAILROAD LAND GRANT SUIT.

Preceding annual reports show the disposition of the main forfeiture suit involving this land grant by the enactment of the Chamberlain-Ferris law of June 9, 1916 (39 Stat., 218), which revoked the land grant and substituted a money grant of \$2.50 per acre. That act authorized and directed the filing of a suit to secure a judicial determination of the amount of money already received by the railroad company on account of the land grant and properly chargeable against it as a part of the full value conferred by the granting acts; and as stated in my last annual report, that suit was filed December 27, 1917.

The defendants' answers have been filed and as they do not contest the Government's claim of title to the unsold lands by virtue of the revestment act of June 9, 1916, the only matters in dispute are items of expense incurred by the railroad company, for which it claims credit, moneys received on account of the land grant, and the total area with which the company is entitled to be credited at the rate of \$2.50 per acre. All these matters are susceptible of proof by records and counsel for the Government and the defendants are preparing a statement of the facts to be stipulated in the case. It is hoped that this statement can be completed and the case submitted to the court during the coming fall.

In addition to the main forfeiture suit instituted against the railroad company involving the unsold lands the Government, in 1909, under the joint resolution of April 30, 1908, instituted 46 other suits against the company and those who had purchased lands from it in violation of the restrictive provisions of the granting acts.

The act of August 20, 1912 (37 Stat., 320), provided that if the purchaser defendants would consent to decrees declaring their titles forfeited to the United States and satisfy the Attorney General that they had actually made their purchases in good faith, they might purchase the lands from the United States by paying \$2.50 an acre therefor.

Most of these cases were settled under that act several years ago, the defendant purchasers availing themselves of the privilege of perfecting their titles by paying the Government \$2.50 per acre. During the year ended June 30, 1919, the two remaining suits were disposed of by decrees setting aside the contracts of purchase and declaring the lands to be unsold lands within the meaning of the Chamberlain-Ferris Act of June 9, 1916.

In this connection it should be stated that two of the defendant purchasers, the Booth-Kelly Lumber Co., and Hammond & Winton, who availed themselves of the privileges afforded by the act of 1912 and thereby acquired perfect title to the lands that they had illegally

bought from the railroad company, brought suits, in the circuit court of the State of Oregon for the county of Multnomah, against the railroad company on account of the alleged failure of their titles. The Booth-Kelly Lumber Co. sued to recover from the railroad company the sum of \$192,837.10, being the entire amount that that company had paid to the railroad company for the lands that it had purchased; while Hammond & Winton sued the railroad company to recover the sum of \$114,932.50, which they had paid to the United States under the act of 1912. These causes were heard together on demurrers filed by the railroad company and at this hearing a representative of the Government filed a memorandum suggesting that the United States was interested in the controversies, inasmuch as it proposed to hold the railroad company to an accounting for all money that it had received on account of the land grant, and contended, therefore, that the purchasers were not entitled to recover. The circuit court for Multnomah County, three judges sitting, rendered an opinion sustaining the demurrers and dismissing the complaints; and both parties have appealed to the supreme court of the State where the cases are now pending. It is believed that a hearing in these cases will be had during the present year at which time the interests of the United States will again be suggested and defended.

THE COOS BAY WAGON ROAD GRANT.

The last annual report shows that the litigation involving this grant was then pending in the Supreme Court, but that the defendant had submitted a proposition looking to the settlement of the case on terms to be approved by Congress and that bills for that purpose were then pending in both the Senate and House.

By the act of February 26, 1919, Congress authorized the acceptance of the defendant's proposition and pursuant to that act a deed reconveying to the United States approximately 93,000 acres of land, was delivered to and accepted by me. For this area the defendants were paid \$2.50 per acre and in addition thereto the Government assumed the obligation to pay the taxes that had been allowed to accumulate on the lands since 1908. These taxes with penalties and interest will amount to approximately \$450,000, an amount in excess of that stated in the last annual report, as additional taxes have since accrued. In return, however, the Government has become revested with undisputed title to lands that are worth not less than \$2,000,000, and possibly considerably more.

LITIGATION CONCERNING OIL LANDS RESERVED BY EXECUTIVE ORDER.

This litigation, as has been indicated in previous reports, involves public lands withdrawn by Executive order from all forms of entry. The Government contends that the defendants, who claim the lands,

are trespassers in that their locations were made in fraud of the law or in violation of the withdrawal orders, or both. The lands involved are immensely valuable for their oil and gas.

On July 1, 1918, there were pending in the United States District Courts 52 suits in California, 3 in Wyoming, and 18 in Louisiana. During the year ended June 30, 1919, one suit was instituted in California. During the same period 3 cases were decided on the merits in California, 2 against and 1 in favor of the Government, and 1 in Wyoming against the Government. There were, therefore, pending in the district courts on June 30, 1919, 50 cases in California, 2 in Wyoming, and 18 in Louisiana, an aggregate of 70 suits. In 11 of these pending suits decisions on the merits have been rendered in favor of the Government, as previously reported, and they are pending on reference to a master to determine the damages due the Government.

On July 1, 1918, there was pending in the circuit court of appeals on appeal by the Government one case in California; and during the year ended June 30, 1919, one case from California and one from Wyoming were appealed to the circuit court of appeals by the Government. All three of these cases were pending on appeal on June 30, 1919; the Wyoming case having been argued and submitted, but not decided. Since the close of the fiscal year 1919, one case from California, decided by the district court on the main questions in favor of the Government, has been appealed by the defendants and a cross appeal has been taken by the Government.

The suit against the Honolulu Consolidated Oil Co. remains pending as at the date of my last report, awaiting the action of the Land Department on the company's applications for patents. In the proceedings in the Land Department the decision of the register and receiver favorable to the Government was reversed by the Commissioner of the General Land Office as to 13 quarter sections and the Navy Department's protests affecting those quarter sections dismissed; and was sustained as to the remaining 4 quarter sections involved on the ground that the locations were "dummy" in character. Appeals were taken to the Secretary of the Interior on behalf of the Navy Department as to the protests dismissed and by the Honolulu Co. as to the other 4 quarter sections. These appeals were argued before the Secretary on July 9, 10, and 11, 1919, and his decision is at this writing awaited.

In my last report reference was made to the institution of new suits in place of three cases which had been dismissed without prejudice because of the insufficiency of the showing made on behalf of the Government. In the new suits a receiver was appointed as to most of the defendants and a commissioner was appointed to supervise operations and other relief granted as to the other defendants.

In three other cases a commissioner was appointed to supervise all operations of the defendant Standard Oil Co., and in two additional suits a receiver was appointed. In one of these cases there is no production, the suit being instituted and a receiver put in charge with a view to stopping the flow of water in an abandoned well which is destructive of the oil sands. In all of these cases where a receiver or commissioner has been appointed injunction has been granted against further drilling pending decision by the Land Office on applications for patent.

In 3 of the 11 cases in California which were referred to a master, the master's reports have been filed and settled, all exceptions on both sides having been disposed of. Final decrees will be entered in the near future. In 2 of these cases the master's reports have been filed and exceptions thereto heard, but not decided by the court. In all but one of the remaining cases referred to the master the accounting is complete, or practically so.

During the year* protests have been filed in the Land Office at Visalia, Calif., on behalf of the Navy Department against the granting of patents upon applications embracing 25 quarter sections in naval petroleum reserve No. 2 and 28 quarter sections in naval petroleum reserve No. 1. Much evidence has been taken in support of these protests, but much more remains to be taken.

There are in California 29 cases in which a receiver or commissioner has been appointed and is now in charge, and 17 in which injunctive and other relief have been granted without receiverships.

In the California suits there was on June 30, 1919, impounded in the hands of receivers an aggregate of \$17,370,799, of which \$4,357,000 represents production from the lands involved in the suit against the Honolulu Consolidated Oil Co. The greater part of the impounded funds has been invested in Liberty bonds.

Preparations are practically complete for the institution of several additional suits for the protection of the Government's interests in valuable oil lands in Wyoming.

The so-called "Ferry Lake cases," in Louisiana, involve lands lying adjacent to Ferry Lake and embraced in the Executive withdrawal order of December 15, 1908, and the confirmatory order of July 2, 1910, which had been referred to a master for findings on the law and the facts prior to the fiscal year 1919, were argued before the master on July 1, 1918. On January 11, 1919, the master filed his opinions and recommendations in 17 cases, holding the Government entitled to recover for the oil and gas extracted, but allowing defendants' counterclaims for the cost of drilling and operation. The findings and conclusions of the master in the remaining case, all in favor of the United States, were filed April 7, 1919. On May 26, 1919, argument was had before the United States District Court for the

Western District of Louisiana, on exceptions by both Government and defendants to the master's recommendations, the Government excepting to the allowance of defendants' counterclaims. In an opinion filed July 17, 1919, the court confirmed the master's findings in all respects, and decrees in accordance therewith were on August 4 signed. By these decrees the Government's title to the land is established, free of any and all claims of defendants, and it recovers an aggregate of \$462,903.39, with interest at the rate of 5 per cent per annum from the respective dates of the filing of the master's reports; also a receiver is appointed to take charge of and operate the wells, and injunctions are granted against further trespass. Some of the defendants have already appealed and others doubtless will appeal; while, on the other hand, the Government will appeal from the allowance to defendants of the cost of drilling and operation. Since the close of the fiscal year 1919, four additional suits have been filed in Louisiana involving land and oil and gas alleged to be worth \$400,000.

As stated in my last annual report, the general policy followed by the department in this litigation has been to protect the naval reserves from further trespasses, in furtherance of the policy of the Navy Department to have a reserve of oil in the ground for future production; and with respect to the withdrawn lands outside of the naval reserves, to encourage production wherever it could wisely be done provided the net proceeds be impounded to await the final determination of title. This policy will be continued unless and until Congress shall by legislative expression direct otherwise.

SUITS AGAINST THE SOUTHERN PACIFIC RAILROAD COMPANY CONCERNING OIL LANDS.

These are seven suits instituted in the southern district of California to cancel patents issued to the Southern Pacific Co. and alleged to have been procured by fraud, in that the company represented to officials of the General Land Office that the lands involved were nonmineral whereas they were, in fact, and were known by the company, to be, valuable oil lands. The suits have been fully described in previous reports. The first one tried, known as the "Elk Hills case," involving some 6,000 acres, was decided in the district court in favor of the Government, but on appeal to the circuit court of appeals, the decision below was reversed. The Government took the case to the Supreme Court where it was argued and submitted at the last term; but a decision has not yet been rendered.¹

The remaining six cases, involving approximately 150,000 acres, were consolidated for hearing, argued and submitted to the district court in April, 1918, and, on August 28, 1919, decision was handed down adverse to the United States. The Government is perfecting an appeal.

¹ Since the above was written the Supreme Court has decided this case in favor of the Government.

THE OKLAHOMA RIVER BED CASES.

These suits have been fully described in previous reports. They involve conflicting claims of the Creek and Osage Tribes of Indians, Indian allottees claiming riparian proprietorship and the State of Oklahoma and its lessees to portions of the beds of the Arkansas and Cimarron Rivers in Oklahoma, worth many millions of dollars for their oil and gas. The Government's contentions on all points have been sustained by the district court in two of the cases in the western district of Oklahoma, which were, at the date of my last report, and are still pending on appeal by the defendants, in the circuit court of appeals. The other suits, pending in the eastern district of Oklahoma, are awaiting the result of these appeals. On account of the extension of the proven oil and gas field in the Creek country, additional portions of the river beds have been leased to operators by the State and have been brought into these suits by supplemental bills, and it will doubtless be necessary to file additional supplemental bills as other portions of the river beds are leased by the State.

SUNK LAND CASES IN ARKANSAS.

These are suits brought to quiet the Government's title to considerable areas of valuable lands in Arkansas which were erroneously designated by early surveys as "lakes," while, as a matter of fact, they were lands in place, temporarily overflowed at the time of survey by flood waters of the Mississippi. Since my last report two additional cases have been terminated by the entry of decrees quieting title in the United States to 54,882.20 acres of the approximate value of \$2,000,000. In three suits still pending, involving 25,581.32 acres, the evidence on the part of the Government has been taken and it is now expected that the defendants will complete their testimony in the near future and that the cases will be disposed of at the November, 1919, term of court. It is probable that two or three additional suits will be instituted during the present fiscal year and these will practically complete this litigation, which thus far has resulted entirely in favor of the Government.

WATER RIGHTS.

The trial of the suit brought by the Government to adjudicate the water rights in that part of the Truckee River flowing in Nevada was begun on August 4 last and the United States has finished its case in chief. It is expected that a decree will be obtained before the beginning of the irrigation season of next year.

During the year the measures looking toward a more extensive use of Lake Tahoe as a reservoir by the United States, including the obtaining of data and the carrying on of negotiations with the

riparian land owners, have been receiving the attention of the Interior Department, and pending their conclusion the litigation affecting the use of the lake by the United States has remained practically as last reported. Preparations have been made by this department for possible additional litigation in case these negotiations fail.

The suit by the Government against the Ramshorn Ditch Co. and water officials of the State of Nebraska, referred to in my last report, has been decided in favor of the Government and an injunction to protect the Government's use of the waters in question has issued. The case involves seepage waters on the North Platte reclamation project.

By cooperation between the Interior Department and attorneys of this department a plan has been worked out looking to the undertaking by the United States of a project for the irrigation of about 60,000 acres of Indian lands and private lands on the Gila River in Arizona under a special provision in the Indian appropriation act of May 18, 1916. Under that legislation the project was only to be undertaken if the Secretary of the Interior should be able to make or provide for a satisfactory adjustment of existing Indian and private water rights and should declare the project feasible. A form of contract under which those rights would be determined and the project undertaken and operated has been executed by a large percentage of the owners of the private lands and water rights that would be affected, and if the remaining preliminaries can be successfully concluded the project will be declared feasible and the work on it begun. The cooperation of this department in the matter is at the request of the Secretary of the Interior and with a view to avoiding litigation that would otherwise be necessary to determine and protect the water rights of the Gila River Indian Reservation.

The two suits brought to protect the water rights of the Indians of the Uintah Basin in Utah have remained as last reported, with the courts protecting the Indians' rights and the Government ready for trial at any time. Meanwhile the legal positions of the Government have been strengthened and the issues greatly narrowed as a result of the actual application to beneficial use on Indian lands, during the past two years, of all but a small percentage of the water covered by reservations and appropriations. They have been still further narrowed by the Government's obtaining a three-year extension of the time in which to apply to beneficial use the rest of the water covered by its permits under the State law. The grounds upon which the defendants have been opposing the Government's demands in these suits having been thus largely cut away, the possibility of settling the cases by the entry of consent decrees is being considered by the representatives of all the parties and there is reasonable prospect of the cases being disposed of in that way.

The original suit in the Supreme Court of the United States between the States of Wyoming and Colorado, in which the United States participated on invitation of the court, referred to in my last report, has not yet been decided.

Other important matters in connection with water rights have been receiving the attention of the Government attorneys. Some of them are not yet in litigation and negotiations are being had with a view to a settlement out of court.

OCCUPATION OF NATIONAL FORESTS BY POWER COMPANIES.

The five cases against the Utah power companies have been kept pending as they were at the date of my last report awaiting compliance by the companies with the departmental regulations requiring them to file applications for power permits to occupy portions of certain forest reserves. The companies have been permitted to delay filing applications for such permits because of their hope of relief from the enactment of proposed water power legislation, which, however, failed to pass at the last session of Congress. They have now been called upon by the Department of Agriculture to file applications for permits under the departmental regulations, as required by the decisions of the courts in these cases.

THE PUEBLO OF SANTA ROSA CASE.

The case of the pueblo of Santa Rosa against the Secretary of the Interior and the Commissioner of the General Land Office was brought January 28, 1915, in the Supreme Court of the District of Columbia. In it the plaintiff, an alleged community of Papago Indians, claiming title in fee under the laws of Spain and Mexico, the treaty of Guadalupe Hidalgo, and the Gadsden treaty to 720 square miles of land in Pima County, Ariz., sought to enjoin the defendant officials from disposing of any portion of the tract involved under the public land laws. Defendants denying that plaintiff owned the fee or had any other or better title than the ordinary Indian right of occupancy and possession, moved to dismiss on the showing made by the bill. This motion was sustained by the trial court and the bill dismissed on April 25, 1916. On appeal by plaintiff to the Court of Appeals of the District of Columbia, the finding by the trial court was on April 27, 1917, reversed and defendants permanently enjoined as prayed. Defendants then appealed to the Supreme Court of the United States where, on March 3, 1919, the decision of the Court of Appeals was reversed and the case remanded to the Supreme Court of the District of Columbia for a new trial. A further motion to dismiss, supported by numerous affidavits, has been filed in the Supreme Court of the District of Columbia on the ground that the suit is unauthorized by the alleged plaintiff or by any individual or tribal Papago Indians,

and is in fact one against their interests and not for their benefit. An answer has also been filed setting up the full facts and alleging that the suit is brought for the ultimate purpose of securing to certain interested individuals title to one-half of more than 2,600,000 acres of land now within the Papago Indian Reservation. The case also involves interesting and important questions as to the title rights of Indians coming under the sovereignty of the United States by the Gadsden purchase, and is regarded as one of exceptional importance.

SUITS TO CANCEL UNLAWFUL CONVEYANCES OF INDIAN ALLOTMENTS.

(A) FIVE CIVILIZED TRIBES.

My last report showed that there were 2,946 cases pending July 1, 1918. Of these 2,010 were disposed of during the fiscal year 1919, resulting in the recovery for the Indians of 285,360.88 acres, of which 191,803.05 acres were recovered by decree and 93,557.83 acres without trial due to the defendants quitclaiming, the approval of the conveyances by the proper county court or the Secretary of the Interior, etc. In addition cases embracing 86,320.96 acres were dismissed because the lands involved were found to be unrestricted or included in another suit, or because of erroneous description; thus there was eliminated from the litigation during the year 371,681.84 acres. This necessitated the preparation and entry of 1,445 decrees and 1,121 orders of dismissal, some of the conveyances embracing one or more full allotments or portions of several allotments belonging to as many different allottees.

In view of the proviso to that portion of the sundry civil bill for the year ending June 30, 1920, appropriating funds for the conduct of this litigation, which provides "that said suits shall be advanced upon the docket and their trial expedited," I wish to set forth a little more fully than I would ordinarily do what has been accomplished since the suits were filed.

The litigation originally embraced 301 suits in equity, filed in July, 1908, to cancel deeds to Indian allotments upon which agreements with the Five Civilized Tribes and the statutes of the United States impose restraints upon alienation. There were involved all told 27,517 conveyances, constituting in effect that many separate cases; so that the word "case" as used with reference to this litigation means the action on an individual conveyance rather than the suit in which it has become involved. Four test cases were as speedily as possible carried through to the Supreme Court, where decisions were rendered in 1912 (see 224 U. S. 413; *id.* 448; *id.* 458; *id.* 471) sustaining the right of the United States to bring suits to annul conveyances of allotments alleged to have been made in viola-

tion of the restrictions referred to and in so doing to join as defendants large numbers of persons claiming under similar conveyances but having no community of interest. The questions of alienability were determined favorably to the Government's contentions in one case (224 U. S. 413) and for the most part adversely in the other three. Following these decisions large numbers of cases controlled thereby were eliminated; many others were dismissed because the defendants quitclaimed the lands in controversy to the Indians or because of settlements otherwise made in favor of the allottees; and still others were dismissed because the information upon the faith of which some of the conveyances were attacked proved incorrect. The settlement of additional questions raised in several other cases, all of which were taken to the Circuit Court of Appeals and one to the Supreme Court, delayed final action on large numbers of the remaining cases, but they have been disposed of as rapidly as has been consistent with the lapse of time necessary for the appeals referred to and the collection and consideration of the facts in each case which have entailed an immense amount of labor. Of the 27,517 original cases, involving 3,842,553.80 acres, 26,581 had been disposed of prior to July 1, 1919, clearing the title to 3,705,358.43 acres and leaving but 936 pending at that date embracing 137,195.37 acres. Approximately 50 per cent of the remaining cases can be disposed of upon presentation to the court without contest on questions of fact as rapidly as the necessary data become available. The remaining 50 per cent involve disputed questions of fact, chief among them questions of heirship; and in many of them the defendants have died, necessitating a revivor against the heirs or the dismissal of the present bills and the institution of new proceedings against the proper parties.

As the bulk of this work has decreased the special force engaged upon it has been reduced until at present it is handled by two special attorneys and two clerks. In pursuance of the direction of Congress that the remaining suits be advanced upon the docket and their trial expedited, the necessary instructions have been issued to the attorneys in charge of the litigation, and it is the hope and expectation of the department that the major portion of the remaining cases will be disposed of during the present fiscal year.

(B) ALLOTMENTS IN THE WHITE EARTH INDIAN RESERVATION.

These are suits to clear the title to certain allotted lands of the Indians of the White Earth Reservation, in Minnesota. Full details thereof will be found in previous reports. At the beginning of the fiscal year 1919 there were 616 suits pending, and during the year 20 additional suits were instituted and 226 terminated, leaving 410 pending June 30, 1919. In 86 of the suits disposed of, decrees were

entered clearing title in the Indians, while 124 cases were dismissed on payment by defendants of an additional consideration insuring the Indians a fair value for their land, in accordance with the plan for the settlement of a large part of these cases, outlined on page 51 of my annual report for 1916, making a total of 210 cases in which the objects of the litigation were attained. There were thus restored to the Government during the year, in trust for the Indians, 6,906.61 acres of land valued at approximately \$65,000, and \$130,385.35 recovered and paid to the Department of the Interior for their benefit. The remaining 16 cases were dismissed because it was ascertained that the allottees were mixed bloods and had received fair value.

Tentative agreements have been made for the settlement of about 100 suits in which final decrees had not been entered on June 30, 1919.

Settlement out of court has been made of matters affecting 74 allotments and a total additional consideration of \$34,060.51 recovered without legal proceedings. In four of these matters 320 acres, valued at \$3,200, were reconveyed to the allottees.

The total value of the recovery for the Indians during the year, lands and money, is \$232,645.86.

SUITS TO CANCEL ILLEGAL ALLOTMENTS.

The case of *United States v. Hettie Lena, alias Emma Coker et al.*, referred to under this head in my last report, was argued and submitted to the circuit court of appeals on June 4, 1919, but has not yet been decided. It involves the title to 160 acres of land in the Creek Nation and the Government contends, on behalf of the Creek Tribe, that it was erroneously allotted in the name of Emma Coker and seeks to cancel the allotment patents and to restore the land to the tribe. The land is being operated for oil and gas and is worth approximately \$2,500,000. The royalty from production, which at this writing amounts to \$45,598.41, is deposited with the superintendent of the Five Civilized Tribes pending the outcome of the suit.

The case of *United States v. Minnie Atkins et al.*, also referred to in my last report, will probably be submitted to the circuit court of appeals at the December, 1919, term. This case also involves 160 acres alleged to have been erroneously allotted in the name of Thomas Atkins. It is valuable for its oil and gas, said to be worth \$3,000,000, and the Government seeks to restore it to the Creek Tribe. Pending suit the property is being operated under a bond of \$900,000 in lieu of a receivership.

Several similar suits pending in the district court will be controlled by the final decisions in the Hettie Lena and Minnie Atkins cases.

REPORT OF ATTORNEY IN CHARGE OF TITLES.

(CHARLES S. LAWRENCE.)

During the fiscal year ended June 30, 1919, there were rendered 573 opinions dealing with titles to lands acquired by the United States by purchase and condemnation and with miscellaneous questions of law connected therewith.

The cost of the lands thus acquired aggregated \$6,285,852.55.

An investigation was made of the title to the dock properties belonging to North German Lloyd and Hamburg-American at Hoboken, for which \$7,146,583 was awarded by the President.

In addition, abstracts were examined preparatory to the institution of numerous cases in condemnation now pending for acquisition under the Weeks forestry law, and for other purposes. The value of the land thus to be acquired can not now be definitely stated.

Appropriations made by the Congress have been utilized to an unusual extent for the acquisition of lands for military purposes needed in the prosecution of the war. In consequence, a very large part of the attention of the title division has been given during the year to condemnation of lands for military uses and to legal questions growing out of the legislation enacted for this purpose.

REPORT OF THE ATTORNEY IN CHARGE OF LAND LITIGATIONS IN THE DISTRICT OF COLUMBIA.

(HENRY H. GLASSIE.)

The proceedings for the condemnation of land for the approaches of the new Key Bridge across the Potomac, begun just before the close of the previous fiscal year, were completed under the immediate conduct of the department, and opinions rendered upon the title to the parcels acquired thereunder.

Under an act authorizing the Secretary of War to execute conveyances for that purpose, the department's tentative agreement with the Pennsylvania Railroad Co. for the compromise of litigation concerning lands along the Anacostia River was consummated in a manner which gave the Government all the city water front claimed, and about half a mile of frontage on the opposite bank of the river.

In *United States v. Marine Railway and Coal Company*, a test case involving the territorial boundary between the State of Virginia and the District of Columbia, as well as of the Government's title to land reclaimed in front of Alexandria, a judgment was rendered in favor of the Government, and the cause is now on appeal.

Investigation was made of legal questions connected with the improvement of the Potomac River, as well as those relating to the expropriation of the North German Lloyd and the Hamburg-Amer-

ican Docks, by the President's proclamation of June 28, 1918, and the settlements thereby rendered necessary.

CUSTOMS CASES.

(BERT HANSON, Assistant Attorney General.)

The following table shows numerically the volume of litigation during the year in the Court of Customs Appeals, as compared with others, since the establishment of that court:

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919
Cases decided on argument:										
Won by the United States.....	106	133	132	116	99	82	75	50	36	37
Won by the importers.....	74	89	83	60	70	76	42	56	25	20
Total.....	180	222	215	176	169	158	117	106	61	57
Issues involved in the above cases decided on argument:										
Won by the United States.....	68	113	126	110	97	79	70	49	33	35
Won by the importers.....	46	75	71	55	65	56	42	44	24	17
Total.....	114	188	197	165	162	135	112	93	57	52
Percentage won by the United States...	59.6	60.1	64.0	66.7	59.9	58.5	62.5	52.7	57.9	67.3
Cases decided without argument:										
Won by the United States.....	112	212	244	41	36	18	22	17	11	4
Won by the importers.....	158	28	49	30	44	20	8	11	6	2
Total.....	270	249	293	71	80	38	30	28	17	6

The above table presents the appellate work of the division. All appeals are from decisions of the Board of General Appraisers, which is the tribunal of first instance. A summary of the work there is appended, together with statistics of previous years since 1910.

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919
Protests:										
Pending at beginning of year.....	95,220	116,087	170,855	146,153	105,731	90,915	76,007	74,472	79,615	57,992
Received.....	65,951	121,187	96,099	58,061	42,125	32,546	18,115	13,655	104,248	9,351
Decided.....	45,084	66,419	120,801	98,483	56,941	47,454	19,650	8,512	125,871	50,353
Pending at end of year.....	116,087	170,855	146,153	105,731	90,915	76,607	74,472	79,615	57,992	8,084
Suspended at end of year.....	33,490	51,524	9,256	26,334	28,500	50,008	59,579	7,460	7,108	.....
Re-appraisements (before single general appraisers):										
Pending at beginning of year.....	425	621	590	906	915	999	2,451	1,828	2,165	1,376
Received.....	3,481	4,506	5,796	4,869	4,686	6,626	5,096	4,523	2,214	2,582
Decided.....	3,285	4,537	5,480	4,860	4,602	5,174	5,719	4,186	3,003	1,749
Pending at end of year.....	621	590	906	915	999	2,451	1,828	2,165	1,376	2,209
Re-appraisements (on appeal to boards):										
Pending at beginning of year.....	105	137	194	234	384	273	647	899	684	229
Received.....	1,020	1,525	1,710	1,691	1,530	1,782	2,568	1,740	848	737
Decided.....	988	1,468	1,670	1,541	1,641	1,408	2,316	1,955	1,303	728
Pending at end of year.....	137	194	234	384	273	647	899	684	229	238

REPORTS OF SOLICITORS.

TREASURY.

(LAWRENCE BECKER.)

The report of the Solicitor of the Treasury shows that in 1,694 of the civil suits instituted during the fiscal year the Government sought the recovery of specific amounts in the sum of \$3,563,435.71, including claims forwarded to this office for suit to the amount of \$41,304.48, but which were settled without suit; and that judgments in favor of the United States were rendered in certain classes of suits instituted during the year and prior thereto, amounting to \$709,440.37. Collections and deposits in these civil miscellaneous suits and claims amounted to \$590,662.57.

In addition, fines aggregating \$5,249,338.25 were imposed in 12,121 of the criminal cases instituted during the year, and fines collected and deposited during the fiscal year in these cases amounted to \$1,565,530.90. Claims were settled by compromise upon the payment of the sum of \$469,001, and there was deposited in the Treasury from unclaimed moneys remaining over five years in court registries, under sections 996 and 4545, Revised Statutes, the additional sum of \$53,555.38, making the total amount collected and deposited in the Treasury under the direction of this office \$2,678,749.85.

There were 11,828 official bonds, contracts, leases, etc., examined and 91 written opinions given and other matters disposed of which can not well be tabulated.

COMMERCE.

(ALBERT LEE THURMAN.)

SUMMARY OF WORK DONE DURING THE FISCAL YEAR ENDED JUNE 30, 1919.

Legal opinions rendered, formal and informal (memorandum).....	258
Contracts examined (approved, disapproved, drafted, redrafted, modified, involving expenditures amounting to \$1,541,221).....	217
Contracts examined (indeterminate amounts).....	18
Contract bonds examined (approved, disapproved, drafted, redrafted, modified, amounting to \$323,796).....	108
Official bonds examined, approved or disapproved (amounting to \$590,500)...	115
Leases examined (approved, disapproved, drafted, redrafted, modified, involving the sum of \$423,938).....	91
Revocable licenses examined (approved, disapproved, drafted, redrafted, modified, amounting to \$3,801).....	20
Insurance policies examined, amounting to \$137,400.....	6
Deeds examined (approved, disapproved, drafted, redrafted, modified, in the sum of \$3,305).....	2
Legislative matters which concern the Department of Commerce (drafting and redrafting of bills, reports relative thereto, etc.).....	366
Miscellaneous matters, embracing everything submitted for the advice or suggestion of the Solicitor, or for the formulation of departmental action, not included in the foregoing items.....	1,534

LABOR.

(JOHN W. ABERCROMBIE.)

Summary of the work performed during the fiscal year ended June 30, 1919:

Legal opinions rendered, formal.....	48
Contracts and leases examined, approved, or disapproved.....	1, 368
Contracts and leases drafted, redrafted, or modified.....	17
Bonds, official, examined, approved, or disapproved.....	10
Bonds, contracts, examined, approved, or disapproved.....	16
Bonds, alien immigrants, examined, approved, or disapproved.....	1, 472
Miscellaneous matters embracing everything submitted for advice or suggestion of the Solicitor, or for the formulation of departmental action, not included in the foregoing items.....	371
Total.....	3, 302

PRISONS, PARDONS, AND PAROLES.

(DENVER S. DICKERSON, Superintendent of Prisons.)

UNITED STATES PENITENTIARIES, TRAINING SCHOOLS, AND BUREAU OF CRIMINAL IDENTIFICATION.

The number of prisoners confined in the United States penitentiaries at Atlanta, Ga.; Leavenworth, Kans.; and McNeil Island, Wash.; St. Elizabeths Hospital, Washington, D. C.; The National Training School for Boys and The National Training School for Girls, and in State institutions other than county jails—that is to say, the major offenders—was 4,788 on June 30, 1919, as compared with 4,482 on June 30, 1918, an increase of 306. This increase is due to war conditions, the number of military prisoners having largely increased, and there being numerous offenders against the selective-draft act, the espionage act, and other laws growing out of the war.

Of this 4,788, 3,852 were confined in the United States penitentiaries, 240 in State and Territorial penitentiaries, 201 in State reformatories and training schools, 228 in The National Training School for Boys, 4 in The National Training School for Girls, 143 in St. Elizabeths Hospital, and 120 in miscellaneous institutions such as workhouses and houses of correction.

(A) PENITENTIARY AT ATLANTA, GA.

The average daily population during the fiscal year 1919 was 1,549; in 1918 it was 1,268. There were 49 deaths, 36 more than during the previous year; 40 deaths were due to influenza and its complications during the epidemic which swept the country during the fall and winter of 1918. The average yearly cost of maintenance per man was \$281.33; in 1918 it was \$289.60. The daily cost per man

was \$0.77; in 1918 it was \$0.793. This decrease is due to curtailment of repairs and improvements, due in turn to an inadequate appropriation, and which if continued will result in deterioration of the plant. The total cost of maintenance during 1919 was \$435,-784.53, the total expenditures being \$494,309.16, the difference, \$58,524.63, representing supplies on hand at the close of the year.

During the year the prisoners were employed in the construction of new prison buildings and of the building to house the new cotton-duck mill, the installing of machinery in the duck mill, the cultivation of the prison farm, and the usual institutional duties. The farm produced supplies of the value of \$31,277.93, at a cost of \$6,980.60, exclusive of the salary of the farmer, making a net profit of \$24,297.33, as compared with a net profit of \$15,929.55 for the preceding year.

During the year substantial progress was made in the construction of the east main cell wing. This wing is nearly completed. Its completion will complete the construction of the institution as originally planned many years ago. The construction of the building to house the cotton-duck mill was completed during the year. This building, of reinforced concrete and brick construction, covers an area of almost 3 acres. It has been pronounced by experienced builders and cotton-mill men to be one of the best of its kind in the country. Substantial progress was made during the latter half of the year in the installation of the equipment. It is believed the entire mill will be ready to operate by November 1, 1919, although it is intended to start up the machines a few at a time, as they are made ready for the work.

In accordance with section 6 of the act approved July 10, 1918, the following report on the duck mill and farm is submitted:

Material and supplies purchased from the operating fund to June 30, 1919.

Material used:

9 gallons heavy loom oil, at 23 cents.....	\$2. 07	
23 gallons red engine oil, at 24½ cents.....	5. 64	
10 gallons transil oil, at 36 cents.....	3. 60	
27 gallons spindle oil, at 21 cents.....	5. 67	
17 gallons Alpha loom oil, at 21 cents.....	3. 57	
94 gallons gasoline, at 24 cents.....	22. 56	
		\$43. 11

Material on hand:

Wrapping paper.....	111. 09
Burlap.....	260. 00
Baling strap iron and tie buckles.....	122. 76
Baling needles.....	. 85
Stencils.....	2. 00
49 gallons Acme comb box oil.....	20. 09
59 gallons heavy loom oil.....	13. 57
43 gallons red engine oil.....	10. 54

Material on hand—Continued.

10 gallons transil oil.....	\$3. 60
102 gallons spindle oil.....	21. 42
97 gallons Alpha loom oil.....	20. 37
109 gallons gasoline.....	26. 16
	\$612. 45

Amount on hand June 30, 1919.....	569. 34
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Yarn purchased and on hand June 30, 1919:

18,902 pounds 13/1, at 60 cents per pound.....	11, 341. 20
11,919.75 pounds 16/1, at 62 cents per pound.....	7, 390. 25
	18, 731. 45

Persons employed:

Superintendent of duck mill, Jan. 1 to June 30, inclusive, 6 months..	3, 750. 00
Mill electrician, Jan. 1 to June 30, inclusive, 6 months.....	900. 00
Overseer of weaving, Mar. 3 to June 30, inclusive, 3 months and 25 days.....	655. 56
Overseer of twisting, Apr. 7 to June 30, inclusive, 2 months and 21 workdays.....	420. 00
Loom fixer, Mar. 3 to June 30, inclusive, 103 workdays.....	412. 00
	6, 137. 56

The above persons were employed in installing equipment and getting mill ready to operate. They had no fixed hours, but worked eight or more hours daily.

Owing to the fact that the mill was not in actual operation up to June 30, 1919, there were no receipts to be credited to this fund at that time, and no wages were paid prisoners.

The additional land which the act of July 10, 1918, authorizes and directs the Attorney General to acquire and cultivate, has not been acquired up to the close of the fiscal year, therefore no detailed report can be made on its operation, as is required by section 6 of the act.

(B) PENITENTIARY AT LEAVENWORTH, KANS.

The average population during the fiscal year 1919 was 1,895; in 1918 it was 1,613. There were 7 deaths during the year, 11 less than during the previous year. Five of the deaths were from pneumonia, complicating la grippe. The average yearly cost of maintenance per man was \$336.65. In 1918 it was \$299.63. The daily cost per man was \$0.9223; in 1918 it was \$0.8209. The total cost of maintenance during 1919 was \$638,041.09. The increased cost was due entirely to advanced cost of many supplies.

During the year the prisoners were employed in the construction of new prison buildings, the cultivation of the prison farm, and the usual prison duties. The construction of the west main cell wing was carried along to a point well toward completion. The estimate in the Attorney General's Annual Report for 1917 that this wing would be ready for occupancy by the winter of 1918 has not been realized for several reasons. The increased price and difficulty in

getting building material have been considerable factors in the delay. In March, 1919, a fire, probably of incendiary origin, destroyed a building containing the blacksmith shop and the stone sawmill, which served to delay the construction.

The value of the farm products for the year was \$41,184.76, exclusive of \$7,341.50 feed raised and fed to stock, and the cost of the farm, exclusive of the farmer's salary, was \$15,996.11, which includes \$1,848.50 expended in purchase and repair of a passenger automobile for use of the warden, making a net profit of \$25,188.65, as compared with a net profit of \$29,481.34 for the preceding year.

(C) PENITENTIARY AT MCNEIL ISLAND, WASH.

The average daily population during the year 1919 was 268; in 1918 it was 239. There were 2 deaths during the year, 2 less than last. The average yearly cost of maintenance per man, exclusive of subsistence furnished officers and guards, was \$316.98; in 1918 it was \$289.77. The daily cost per man was \$0.8684; in 1918 it was \$0.793. The total cost of maintenance during 1919 was \$88,437.70. The prison farm produced supplies of the value of \$20,472.89, at a cost of \$6,668.04, making a net profit of \$13,804.85, as compared with a net profit of \$9,667.27 for the preceding year.

During the year the prisoners were employed in excavating and filling, construction of new prison buildings, farming, and the usual prison duties.

(D) NATIONAL TRAINING SCHOOL FOR BOYS.

The report of the board of trustees shows that there were confined in the school on June 30, 1919, 412 juvenile offenders, as compared with 389 on June 30, 1918. There were received during the year 311 juvenile offenders; during 1918, 222. Of those received during 1918, 3 were committed by the Supreme Court of the District of Columbia; 133 by the juvenile court of the District of Columbia; 143 by the United States courts, and 23 paroled boys and 9 escaped boys were returned.

The board urges legislation to secure commitments from the United States courts on the same basis as commitments from the courts of the District of Columbia, namely, commitments during minority instead of for a definite number of years.

(E) NATIONAL TRAINING SCHOOL FOR GIRLS.

The report of the board of trustees shows that there were confined in the school on June 30, 1919, 101 girls; on June 30, 1918, there were 83. During the year there were 50 commitments; 10 returned for violation of parole; 32 were released on parole.

The board recommends the acquisition of 100 acres of unimproved land lying south of the present school grounds and they ask an appropriation of \$100,000 for this purpose.

(F) BUREAU OF CRIMINAL IDENTIFICATION.

During the year ended June 30, 1919, 59,289 criminal records were received, of which 50,752 were finger-print records and 8,537 anthropometric or Bertillon records. During 1918, 56,472 were received. There were on file at the close of the year 1919, 262,712 finger-print records, 71,004 Bertillon records, and 365,295 index record cards. During the year 14,987 identifications were made, of which 13,830 were by the finger-print system, 1,040 by the Bertillon system, and 117 from the index cards. Among the number identified were 182 parole violators and 171 escapes. In addition the bureau was the means of apprehending numerous other fugitives from justice. The bureau sent out 47,656 pieces of criminal information, as compared to 42,870 sent out during the preceding year.

During the year the bureau added to its list of contributors 2 penal institutions, 16 police departments, 39 sheriffs, and others, giving the bureau a total of 494 contributors. In addition to its business with these authorized cooperators, the bureau has handled hundreds of special cases from all parts of the country, as well as from England, Canada, and Australia.

This bureau is now generally recognized by penal institutions, Government departments and bureaus, police departments, sheriffs, and other peace officers as the national clearing house for criminal identification records and information.

PAROLES.

During the year 488 prisoners were released on parole, as compared with 257 during the year 1918. Of this number 332 were released from the Federal penitentiaries, as compared with 210 during the previous year. The paroles of 15 prisoners were terminated for violation of the conditions of their parole, as compared with 21 in the prior fiscal year.

Paroled prisoners earned for themselves during the year \$307,947.10 in money, besides in many instances receiving board and lodging. These figures do not include the value of crops, etc., produced by those who were engaged in farming for themselves.

The administration of the parole law during the year has cost the Government \$10,950.41, as compared with \$11,725.32 for the preceding year. This includes salaries, traveling expenses, stationery and printing, etc.

SUMMARY OF BUSINESS, REVENUES, AND EXPENDITURES, DEPARTMENT OF JUSTICE AND COURTS OF THE UNITED STATES.

(Detailed information will be found in accompanying exhibits and Treasury reports.)

1. BUSINESS.

(A) SUPREME COURT OF THE UNITED STATES.

Number of cases and other proceedings docketed during the year.....	582
Number of cases and other proceedings disposed of during the year.....	669
Number of cases and other proceedings pending at the close of the year.....	408

(B) UNITED STATES COURT OF CUSTOMS APPEALS.

Number of cases and other proceedings docketed during the year.....	72
Number of cases and other proceedings disposed of during the year.....	63
Number of cases and other proceedings pending at the close of the year.....	35

(C) COURT OF CLAIMS.

Number of cases and other proceedings docketed during the year.....	156
Number of cases and other proceedings disposed of during the year.....	896
Number of cases and other proceedings pending at the close of the year.....	544

(D) COURTS OF APPEALS.

Number of cases and other proceedings docketed during the year.....	1, 506
Number of cases and other proceedings disposed of during the year.....	1, 508
Number of cases and other proceedings pending at the close of the year.....	910

(E) DISTRICT COURTS.

Number of cases and other proceedings commenced during the year:	
Civil cases to which the United States was a party.....	4, 975
Criminal prosecutions by the United States.....	47, 443
Admiralty cases.....	2, 605
Other suits to which the United States was not a party.....	11, 220
Bankruptcy proceedings.....	14, 048
Total.....	80, 291
Number of cases and other proceedings terminated during the year:	
Civil cases to which the United States was a party.....	6, 280
Criminal prosecutions by the United States.....	35, 734
Admiralty cases.....	1, 968
Other suits to which the United States was not a party.....	20, 089
Bankruptcy proceedings.....	19, 351
Total.....	83, 422
Number of cases and other proceedings pending at the close of the year:	
Civil cases to which the United States was a party.....	6, 105
Criminal prosecutions by the United States.....	28, 496
Admiralty cases.....	5, 899
Other suits to which the United States was not a party.....	23, 758
Bankruptcy proceedings.....	31, 997
Total.....	96, 255

2. REVENUES.

Collections, judgments, fines, etc. (Exhibit 2):	
In civil matters and cases.....	\$1,080,253.49
In criminal prosecutions.....	1,917,828.39
Earnings from individuals and corporations by United States marshals (Exhibit 6).....	113,379.90
Excess of emoluments paid into the Treasury during the year by clerks of courts (Treasury report).....	51,012.19
Unclaimed moneys from court registries (Treasury report).....	54,560.17
Proceeds of sale of Government property and other miscellaneous items (Treasury report).....	9,628.88
Total.....	3,226,663.02

3. EXPENDITURES (INCLUDING KNOWN LIABILITIES).**(A) DEPARTMENTAL.**

General salaries and contingent funds, including rent and public printing.....	\$641,865.81
District attorneys, regular assistants, and special assistants.....	1,290,436.52
Witnesses.....	1,178,122.08
Special legal branches of departmental work.....	249,284.44
Investigation.....	2,282,819.42
Maintenance of prisoners, etc.....	2,447,840.95
Public works.....	727,186.36
Not specially classified.....	507,272.18
Total.....	9,324,827.76

(B) UNITED STATES COURTS.

Supreme Court of the United States.....	\$172,842.74
United States Court of Customs Appeals.....	67,937.67
Court of Claims.....	87,936.89
District of Columbia courts.....	184,019.07
Circuit courts of appeals, district and territorial courts.....	5,259,201.78
Total.....	5,771,938.15

(C) SPECIAL ITEMS.

Expenditures under "National security and defense".....	816,852.95
Increase of compensation, Department of Justice, and District of Columbia.....	305,721.16
Grand total.....	16,219,340.02

The exhibits accompanying this report follow immediately.

A. MITCHELL PALMER,
Attorney General.

REPORT OF THE POSTMASTER GENERAL.

NOVEMBER 7, 1919.

TO THE PRESIDENT:

The Postmaster General has the honor to present his report for the fiscal year ended June 30, 1919.

POSTAL FINANCES.

The revenues of the Postal Service for the fiscal year ended June 30, 1919, as reported by the Auditor for the Post Office Department, including the revenues from money-order and postal savings business and the increase in postage derived from the 3-cent rate on letter mail and the 2-cent rate on postal cards and post cards, amounted to \$436,239,126.20.

The act of Congress increasing the postage rates became effective on November 2, 1917, and expired by limitation on June 30, 1919. The increase in the rates was virtually a war tax, and has been so treated in compiling postal statistics for comparative purposes. The collections under the act during the period in which it was in force, which necessarily were estimated, amounted to \$115,892,000, and were turned over to the Treasury of the United States monthly as they accrued in the manner prescribed by the act. The estimated collections during the period from November 2, 1917, to June 30, 1918, amounted to \$44,500,000, and during the period from July 1, 1918, to June 30, 1919, to \$71,392,000.

The ordinary postal revenues for the fiscal year 1919, therefore, after deducting the estimated collections for increase in postage, amounted to \$364,847,126.20. For comparative purposes this sum represents the normal revenues of the Postal Service and shows an increase over the preceding year of \$20,371,163.96, or 5.91 per cent.

The audited expenditures for the year were \$362,497,635.69, an increase over the preceding year of \$37,663,907.22, or 11.59 per cent.

The audited revenues therefore exceeded the audited expenditures by \$2,349,490.51. After deducting losses of postal funds by fire, burglary, and other causes, amounting to \$6,638.55, the accounts as closed for the year show a surplus of \$2,342,851.96.

This surplus is subject to adjustment, however, as it is based on actual cash payments made during the fiscal year 1919 and includes payments for services performed and supplies purchased in preceding years which could not be paid in the years in which the obligations were incurred. The payments on account of prior years should be eliminated in the adjustment, and on the other hand obligations of like character incurred in 1919 and paid in subsequent years should be taken into account.

Firm in the belief that the postal establishment should be self-supporting, it has been the policy and constant aim of this administration, during the seven years of its tenure of office, to equalize postal revenues and expenditures in so far as it is possible to do so, in order that postal operations might be removed from consideration in connection with the levying of taxes. This, it is submitted, is sound public policy. To administer the affairs of the service without regard to economy and efficiency, passively submissive to the grip of selfish private interests which fatten on extravagance, privilege, and favoritism, is not only a breach of public trust, but inevitably results in an unwarranted burden on the public treasury. On the other hand to conduct the service with an eye single to profit is to impose a supplemental tax and thereby assume a function not contemplated or delegated by law. The service belongs to the people and should be conducted for their use and benefit, but those who use the mails for particular purposes should pay for the service rendered them at rates approximating the cost of the service. There should be no class distinction of any kind. The attempt to equalize the revenues and expenditures can only produce approximate results, however, for the revenues depend upon the patronage of the public, and the necessity of making many long-term contracts for the carrying of the mails precludes the possibility of adjusting expenditures concurrently with periods in which the revenues are relatively low.

In keeping with these principles the controlling purpose of this administration has been to promote efficiency by the complete standardization of the service—by harmonizing equipment, adjusting the personnel in respect to individual fitness and ability, and securing the greatest possible cooperation in every quarter. If these efforts brought the expenditures below the revenues, the surplus was to be used for the enlargement of the service, and, when justified, to a reduction of rates. Where it has been necessary to enlarge postal facilities money has been spent without stint; where extravagance or waste were apparent the pruning knife has been applied without fear or favor. That the carrying out of these principles has been efficacious is demonstrated by the table which follows showing the financial results of postal administration during the two successive seven year periods from July 1, 1905, to June 30, 1919, being the

fiscal years 1906 to 1919, inclusive. The figures have been taken from the official reports of the Auditor for the Post Office Department, and while the first fiscal year reported in the second period was partly in the tenure of office of the previous administration it appears that the revenues and expenditures for the first half of that year were approximately equal and therefore negligible for comparative purposes.

Period.	Revenues.	Expenditures.	Losses.	Surplus (+) or deficit (-)
Period from July 1, 1905, to June 30, 1912, being the fiscal years 1906 to 1912, inclusive:				
1906.....	\$167,932,782.95	\$178,449,778.89	\$25,945.82	—\$10,542,941.76
1907.....	183,585,005.57	190,238,288.34	38,748.70	— 6,692,031.47
1908.....	191,478,663.41	208,351,886.15	37,056.25	— 16,910,278.99
1909.....	203,562,383.07	221,004,102.89	38,050.65	— 17,479,770.47
1910.....	224,128,657.62	229,977,224.50	32,915.07	— 5,881,481.95
1911.....	237,879,823.60	237,648,926.68	11,778.80	+ 219,118.12
1912.....	246,744,015.88	248,525,450.08	4,088.90	— 1,785,523.10
Total.....	1,455,311,332.10	1,514,195,657.53	188,584.19	— 59,072,909.62
Period from July 1, 1912, to June 30, 1919, being the fiscal years 1913 to 1919 inclusive:				
1913.....	266,619,525.65	262,067,541.33	41,333.41	+ 4,510,650.91
1914.....	287,934,565.67	283,543,789.16	14,333.46	+ 4,376,463.05
1915.....	287,248,165.27	298,546,026.42	35,447.82	— 11,333,308.97
1916.....	312,057,688.83	306,204,033.14	24,419.62	+ 5,829,236.07
1917.....	329,726,116.36	319,838,718.40	51,186.06	+ 9,836,211.90
1918.....	344,475,962.24	324,833,728.47	15,459.69	+ 19,626,774.08
1919.....	364,847,126.20	362,497,635.69	6,638.55	+ 2,342,851.96
Total.....	2,192,909,150.22	2,157,531,452.61	188,818.61	+ 35,188,879.00
Increase over previous 7-year period....	737,597,818.12	643,335,795.08	234.42	
Per cent of increase.....	50.68	42.49	.12	

It will be observed that in the first period, covering the seven years prior to the time the present administration assumed office, there was an unbroken line of annual deficits, excepting in 1911, when a small surplus was shown, the aggregate net deficit for the period amounting to \$59,072,909.62. On the other hand, in the second period, covering practically the tenure of office of the present administration, there has been an unbroken line of annual surpluses, excepting in 1915, the year in which the great World War began, the aggregate net surplus for the period amounting to \$35,188,879. The net change in favor of the Public Treasury was, therefore, \$94,261,788.62. The cause of the change is immediately apparent. Whereas the revenues under this administration increased \$737,597,818.12, or at the rate of 50.68 per cent, compared with the seven-year period prior to the time it assumed office, the expenditures increased only

\$643,335,795.08, or at the rate of 42.49 per cent. The difference between the increase in expenditures and the increase in revenues, less losses, equals the amount of the net change in favor of the Public Treasury.

Each branch of the service participated substantially in the increased expenditures for this period, particularly the branches composed wholly or largely of salaried employees, as the following table will show:

Branch.	Amount of increase.	Per cent of increase.
Post Office Service:		
Salaries of postmasters.....	\$32,920,358.80	17.82
Salaries of clerks, etc.....	166,463,189.07	69.93
City Delivery Service.....	99,274,541.28	49.39
Other expenditures.....	43,411,661.80	63.27
Railway Mail Service.....	71,828,129.78	57.32
Rural Delivery Service.....	129,930,820.72	54.68
Transportation of domestic mail:		
By railroads.....	57,322,425.06	16.53
By other means of transportation.....	40,120,954.73	46.22
Transportation of foreign mail.....	3,180,278.77	14.10
Payment of invalid money orders.....	¹ 1,116,564.93	¹ 39.64
Total.....	643,335,795.08	42.49

¹Decrease.

It is believed that much of the criticism that has been directed at the financial policy of this administration was due to lack of complete and accurate information as to the facts. Criticism from the interests adversely affected was to have been expected. The facts as above presented tell a story of achievement. They do not call for explanations or apologies and none are given. The administration stands squarely on its record.

IMPROVEMENTS AND EXTENSIONS IN THE POSTAL SERVICE.

Since 1913 many additional postal facilities have been provided for the public.

Nothing has been left undone that was within the authority of the Postmaster General to do to effect readjustments in the interest of all the people and not in that of any special class.

Because of the curtailment of what may be termed "special class" postal facilities there has grown up strenuous hostility upon the part of a limited number of "special interests," the expense of whose private business was largely paid by the Government instead of by themselves. This has particular reference to the modifying of the second-class mailing privilege which had until the advent of the present administration been grossly abused.

The more important improvements may be epitomized as follows: Inauguration of the air-mail service; establishment of the "space system" in determining the compensation of railroads for carrying the mail; readjustment of railway mail service in the interest of both improvement and economy; readjustments of organizations in post offices, methods of service, and distribution of supplies, on a basis of sound business principle; inauguration of rural and city motor vehicle service and village delivery service; extension of box and collection service and postage-stamp, money-order and registry facilities to patrons on star routes; improvements in the registry system, insured parcel post, and methods of handling dead letters; readjustment of rural delivery service, providing more equitable distribution of facilities to patrons already served and extensions of facilities to those citizens who had theretofore been denied any service at all; complete reorganization of the equipment and supply services through the extension of operation and economy of production, and the introduction of modern shop methods, equipment and appliances, effecting substantial savings and improvement in the service; the partial adjustment of the postage rates on second-class mail matter, effecting a saving of over \$15,000,000 annually; reduction of letter postage between the United States and several foreign countries; large extension of international parcel post, and the increase in weight and size of parcels permitted in the mails.

The act creating the parcel post went into effect on January 1, 1913, and while that law contained many provisions that should at the time have been modified in the interest of the public, the Congress in its wisdom vested the Postmaster General with authority to make from time to time such changes as might be found necessary to the proper extension and betterment of the service. The Postmaster General has taken advantage of that authority and thereunder effected many reforms and improvements. The increase in the volume of business growing out of this service is indicated by the fact that the number of parcels mailed in 1913 was 331,394,800, and in 1919 the number mailed was more than 2,250,000,000. The extent of usefulness of the service to and popularity with the public is reflected in the last estimate of the profits in handling parcel post, which was made in 1916, when the figures compiled indicated a profit in round numbers of \$10,000,000. War activities taken over by the Postal Service in addition to its regular functions have prevented further compilation of current statistics on this subject.

On May 18, 1916, the Congress, upon the urgent recommendation of the Postmaster General, amended the original postal savings law by removing altogether the monthly limit on deposits of \$100 and increased the amount that a depositor may have to his credit from \$500 to \$1,000. On July 2, 1919, the Congress, also upon the

recommendation of the Postmaster General, again amended the postal savings act by further increasing the amount that a depositor may have to his credit from \$1,000 to \$2,500. A number of important changes in the postal savings system have been inaugurated which have broadened its scope of usefulness and greatly benefited the public.

The Postmaster General in his report for 1913 recommended legislation looking to the compensation of injured postal employees and this led up finally to the enactment on September 7, 1916, of the present law, which is proving of great benefit to all Government employees injured while in the service of the Government.

Salaries of employees in all grades have been increased, working conditions and hours of labor improved, and everything possible done for the health and comfort of the employees.

In order that the spirit and letter of civil service might be conscientiously carried out as far as practicable, and pending enactment by the Congress of legislation which, though repeatedly urged by the Postmaster General, failed of passage, several Executive orders have been issued by the President extending in effect the classified civil service to postmasterships of all classes and requiring that those who were blanketed into civil service by Executive orders under previous administrations without having been subjected to any civil-service or merit test whatever shall be required to pass a civil-service examination. This is believed to be a long step in the direction of higher standards in the Government service and a more businesslike administration of postal affairs.

INCREASED VOLUME OF MAIL.

As stated in the last annual report, the volume of mail handled during the fiscal year ended June 30, 1918, exceeded that of any other like period in the history of the department, and this condition has not been materially changed during the present fiscal year, for the reason that all of the executive departments and independent establishments of the Government which expanded their operations on account of the war, as well as a number of war activities, have continued them since, and their use of the mail service has added a greatly increased volume of work upon this department.

The exigencies of war imperatively demanded that scrupulous care be exercised by every branch of the Government service in conserving revenues, hence it was not possible to extend postal facilities as would have been done in normal times; but with the restoration of business from a war to a peace basis the country is experiencing an era of the greatest industrial development and prosperity in its history, which naturally is reflected in the Postal Service and indicates that there has not been, by reason of the signing of the armis-

tice, any considerable curtailment in the responsibilities and demands imposed upon it. In the circumstances, the public interest requires that the Postal Service be substantially extended and built up to meet the rapid growth of the country and the needs of business.

WAR ACTIVITIES.

The department continued during the year its assistance and co-operation to other branches of the Government, utilizing the extensive organization and personnel of the Postal Service in the execution of the numerous details of the Government's war program and war activities. Aside from the extensive use of the mails in the regular manner, practically every department of the Government has sought the facilities of the postal establishment in putting its war plans and work before the people of the country. This material assistance has been afforded in every instance where it could be done without curtailing or abridging the Postal Service. Some of the most unusual, highly important, and extraordinary activities not connected with the mail service were placed upon the postal establishment. They may be briefly stated, as follows:

The establishment and maintenance of mail service for the military forces in the United States and abroad.

The operation of the telegraph and telephone systems.

The transportation and delivery of tens of thousands of tons of mail for the various war agencies.

The administration of the provisions of the espionage and trading with the enemy acts, the purposes of which were to prevent the use of the mails in disseminating matter calculated to incite disloyalty and sedition against the United States Government during the war.

The registration of enemy aliens and the listing of enemy-owned property by postmasters.

The reporting of disloyal utterances.

The use of post-office inspectors in furnishing information to the intelligence service of the Army and Navy and to the Departments of State and Justice.

The distribution of over 20,000,000 questionnaires of the first and second selective drafts. The successful conduct of the war rendered it imperatively necessary that these questionnaires be quickly dispatched. Each questionnaire had to be handled five different times. This imposed upon the postal establishment a tremendous volume of mail and a grave responsibility for the quick and efficient distribution thereof. It was accomplished to the entire satisfaction of the War Department.

The use of post offices as recruiting agencies for the Army, Navy, and Marine Corps, and as employment agencies for the Department of Labor.

The issuing of export licenses and furnishing income-tax information at post offices.

The use of post-office lobbies for posting public bulletins as to various war measures and activities.

The use of the postal organization in connection with the Nation-wide fuel and food conservation campaigns, also in connection with the sale of Liberty and Victory bonds, War Savings, Thrift, and revenue stamps, and practically every other activity and patriotic endeavor intended to aid in successfully prosecuting the war.

Postmasters and postal employees generally have responded cheerfully to these numerous demands upon and extraneous duties required of them, evidencing at all times a noteworthy spirit of loyalty and patriotism. The Postal Service as a whole is credited with 83 per cent of the total amount of sales of War Savings stamps. One letter carrier sold and personally delivered \$160,000 worth of War Savings stamps, and there were many similar cases of noteworthy and commendable individual effort in every branch of the Postal Service. Furthermore, the personnel of the service subscribed to their limit to the various Government loans, as well as contributing liberally to the funds to carry on the social and welfare work in the armies and camps.

MILITARY MAIL.

Immediately upon the mobilization of troops the Post Office Department undertook the installation and operation of a military branch post office at each of the camps, cantonments, aviation fields, and naval training stations established by the War and Navy Departments, with a view to supplying the postal needs of our soldiers, sailors, and marines. During the progress of the war, 151 of these military branch post offices, fully equipped with every modern facility for the transaction of all branches of postal business, were inaugurated and manned with experienced clerks drawn from large post offices throughout the country, who volunteered for this work through patriotic motives for the sole purpose of rendering a service second only to that performed by the soldiers in the trenches. Because of this voluntary service on the part of postal employees, the department was able to render to the soldiers in the camps of this country a postal service equal in all respects to that received through their home offices. More than 1,200 willing and efficient clerks were thus obtained who endured the hardships and inconveniences of camp life in all portions of the country so long as their services were required, many of them continuing on duty to the present time.

The buildings used for post-office purposes at the various camps were provided by the War Department, as were also barracks for the sleeping accommodations of the post-office employees. Despite

the fact that these buildings were not of sufficient capacity to properly house the clerks or accommodate the large volume of mail handled, the service was satisfactory both to the department and to the military personnel and brought forth hearty praise from parents, relatives and friends.

It was early realized that to effect delivery of mail to soldiers who had moved from one camp to another, or from unit to unit within a camp, means must be provided whereby each change of designation or location could be recorded and mail properly forwarded to the new address. This difficulty was overcome through the installation of an elaborate card-filing system which, with the cooperation of the military authorities, was kept current at all times. Letters and packages that could not be delivered at the camp of address were immediately forwarded to other camps or to overseas addresses. Frequent changes in assignments and transfers from point to point, in some cases amounting to 40,000 at a single camp within a month, added greatly to the labors in the branch post office and the fact that mail for the transferred soldiers was promptly forwarded and delivered at the new addresses demonstrates the efficiency of the system. Many cases have been reported to the Department where mail followed soldiers from the camp of mobilization to the camp of embarkation and was delivered to the addressees before they embarked for the other side. Much trouble was experienced, however, through the carelessness of mailers in giving incorrect and insufficient addresses. The duplication of names in a camp of 60,000 or more troops as well as the duplication of company letters and regimental numbers precluded the possibility in many cases of effecting delivery. It was to this class of mail, more particularly, complaints were directed and in each instance where investigation was made the failure to deliver was found to be due to the carelessness or neglect on the part of the sender and not to inefficiency on the part of post-office employees.

Since the signing of the armistice and the beginning of the return of our soldiers from France, large quantities of letter mail have been returned to this country from overseas where it failed of delivery and was sent to the various camps in this country designated by the War Department as demobilization centers. Unfortunately, because of the delay in returning this mail, it reached the demobilization camps after the soldiers had been discharged and it was found necessary to return the mail to the senders. Failure to deliver in such instances was through no fault of the Post Office Department but to the failure of the military authorities in France, under whose jurisdiction the handling of the mail for soldiers overseas was

placed on July 1, 1918, to effect delivery or to return promptly mail intended for returned soldiers.

The magnitude of the business transacted at the various military branch post offices, as indicated by the financial returns on file in the department, shows that during the period of mobilization the postal receipts from the various branch post offices amounted to as much as \$1,000,000 a month, an amount in excess of the receipts of the third largest post office in the United States. Approximately 90,000 money orders were issued monthly, amounting in the aggregate to nearly \$2,000,000, with a proportionate amount of registered, C. O. D. and insured business.

Since the demobilization of troops, from November, 1918, the number of military branch post offices has decreased until at the present time but 77 are in operation.

FOREIGN MAIL SERVICE.

Fostering of the export trade of the United States through the improvement and extension of the foreign mail service has been one of the dominant features of the postal service under this administration.

The reduction in letter postage between the United States and certain countries of the Western Hemisphere, enlargement of the foreign parcel post service, and the general expedition and improvement of the mail service between the United States and foreign countries, particularly to those of Central and South America, since 1913, offers marked inducement to the development of our foreign trade.

From 1913 to 1919 the international parcel post service was extended from 47 to 85 countries or colonies. Agreements were effected during this period with 13 countries or colonies increasing the weight limit on parcels from 11 pounds to 20 or 22 pounds. The dispatch of parcel post matter to foreign countries increased from 2,831,512 pounds in 1913 to 17,102,131 pounds in 1919.

Special postal conventions with 11 countries of the Western Hemisphere have been effected since 1915 providing for a reciprocal domestic letter rate on letters exchanged between the United States and those countries or colonies.

The British colony of the Windward Islands has entered into an agreement with the United States for the application of the domestic rate of the country of origin to letters addressed for delivery in the other country, and it is hoped, now that the war is over, that the remaining countries and colonies of the Western Hemisphere will assent to the department's proposals for reciprocal domestic rates of postage.

The mail services suspended on account of the war were restored as promptly as circumstances permitted, and at the end of the year

mail service was in operation to all countries except to Hungary and the parts of Russia under Bolshevik control.

Every encouragement has been given to fast steamship lines carrying mails, and the service to Central and South American ports, and to Europe, has been expedited.

The cost, from 1892 to June 30, 1912, of carrying the mails by contract ships, authorized under the ocean mail act of 1891, was \$8,000,000 more than if carried at the pound rate charge of non-contract ships. Through intelligent management the cost of the contract service for the six fiscal years ending June 30, 1919, was reduced to \$2,566,694.35 less than it would have cost if the mails had been carried by noncontract vessels.

Upon the opening of the Panama Canal arrangement was made so that the mails dispatched from the United States for the west coasts of Central and South America instead of being transported across the Isthmus by railway were as far as possible transshipped from steamer to steamer at Colon, thereby very greatly reducing the expense to the department on account of transportation across the Isthmus. The cost of transporting the mails across the Isthmus during the fiscal year ended June 30, 1913, was \$149,732.92 and for the fiscal year ended June 30, 1919, it was \$12,773.94.

INTERNATIONAL PARCEL POST.

During the last fiscal year parcel post conventions were concluded with Chile, Paraguay, Roumania, Siam, and the Union of South Africa; and by virtue of arrangements made under conventions heretofore concluded parcel post service was extended to Algeria, British India, Corsica, Egypt, French India, Iceland, Luxembourg, Madeira Islands, Mesopotamia, Palestine, and Tunis. The parcel post service for Belgium, Denmark, Germany, Greece, Liberia, the Netherlands, Norway, and Sweden, which was suspended during the war, was resumed. Arrangements were made for the increase in the maximum weight from 11 to 22 pounds of parcel post packages for Brazil, British Honduras, Colombia, Guatemala, Republic of Honduras, Nicaragua, and Peru, and to 20 pounds for Argentine Republic. Negotiations are being continued with the view of extending the service to all places to which it is not in operation, a convention having been concluded with Spain since the end of the year providing for service to Spain and her possessions (the Belearic Islands, the Canary Islands, and the Spanish possessions in North Africa).

Notwithstanding the interruptions to the international parcel post service due to the war, the weight of the parcel post mails dispatched during the year was 17,102,131 pounds, or an increase of 23.57 per cent over the previous year; of which 7,218,186 pounds represent the weight of the parcel mails dispatched to Mexico, Central and South

America, an increase of 1,112,234 pounds, or 18.22 per cent over the parcel mails dispatched to said countries during the preceding year.

OCEAN MAIL SERVICE.

The conditions affecting mail-carrying steamers mentioned in the report for last year were similar during this year. The contract steamers on the New York-Liverpool route were not returned to the department by the military and naval authorities, but fairly satisfactory service was maintained through continued cooperation with the War and Navy Departments, the War Trade Board, and the Shipping Board.

The cost of the contract service on route No. 80, San Francisco-Sydney, was \$177,058.84 less than the conveyance of the mails concerned would have cost if the steamers had been paid at the rates applicable to noncontract steamers; and for the first time the cost of the contract service on route No. 36, New York to La Guaira, Venezuela, and on route No. 37, New York to Maracaibo, Venezuela, was less than the service would have cost by noncontract steamers—on the former route \$25,086.51 and on the latter \$28,739.12 less.

The arrangement which became effective November 1, 1916, whereby all mails dispatched from the United States for the west coast of South America via the Isthmus of Panama are consigned to the director of posts of the Canal Zone, who supervises their onward dispatch, continued to operate with gratifying results, and further reduced the cost of the Isthmus transit of United States mails, the cost for the fiscal year 1919 being \$12,773.94, or \$4,609.12 less than the cost for the fiscal year 1918, and \$94,820.51 less than the year 1916.

MILITARY MAIL SERVICE ABROAD AND POSTAL CENSORSHIP.

Upon the signing of the armistice in November, 1918, the department promptly began to bring about readjustments to a peace basis. Curtailments of the service in connection with the American Expeditionary Forces in France were immediately begun and continued as rapidly as possible. At the end of July, of the 352 postal employees who had been engaged in the service in France only 92 remained. In Siberia the service has been continued without material change. The postal censorship mentioned in the last report of the Postmaster General was rapidly diminished and was entirely discontinued before the end of the year. Of the amount (\$1,620,000) appropriated for the censorship service \$285,538 was returned to the Treasury as unexpended balance.

AIR MAIL SERVICE.

The present Postal Administration was prompt to seize upon the great possibility of expediting the mails offered by the invention

of the aeroplane, and repeatedly the Postmaster General has urged appropriations for an experimental air mail service.

The development of the aeroplane in warfare inspired the belief that it could be made to serve the uses of peaceful transportation, and with this in view the Post Office Department was successful in securing an appropriation by Congress of \$100,000 for the fiscal year ending June 30, 1918, for an experimental air mail route. On May 15, 1918, the present successful New York-Washington route on a regular schedule was inaugurated. The service operates in about one-half the time required by train between the two cities and is performed with a regularity and a certainty which up to this time has not been equaled anywhere in the world.

During the fiscal year ending June 30, 1919, the appropriation of \$100,000 was repeated. So successful was the service that for the fiscal year ending June 30, 1920, Congress appropriated \$850,500, which has enabled the extension of the Air Mail Service to Cleveland and Chicago, with a saving in time of 11 hours in transit over the fastest passenger-train service between New York and Chicago and an expedition by 16 hours in the actual delivery of the letters.

The slowing down by the railroads of the running time of important mail and passenger trains has emphasized the importance of extending the Air Mail Service. How these roads have slowed down certain important mail trains since 1913 and the time in which mail can be delivered by aeroplane is shown in the following table:

Scheduled time of mail trains in 1913 and 1919.

From—	To—	1913	1919	Possible by air mail.
		<i>H. m.</i>	<i>H. m.</i>	<i>H. m.</i>
Boston.....	Detroit.....	18 10	21 55	8 20
Do.....	Chicago.....	25 50	27 00	8 45
Do.....	New York.....	5 36	6 50	3 00
New York.....	Chicago.....	23 50	24 20	9 30
Do.....	Omaha.....	36 20	38 30	15 20
Do.....	Minneapolis.....	35 42	36 54	13 30
Do.....	St. Louis.....	23 55	28 45	12 05
Do.....	Jacksonville.....	27 35	29 22	11 54
Do.....	Seattle.....	53 15	90 00	31 54
Do.....	Portland.....	84 30	90 30	32 51
Do.....	San Francisco.....	86 40	90 30	35 00
Washington.....	Jacksonville.....	22 00	24 40	8 56
Do.....	New Orleans.....	33 30	36 30	12 51
Do.....	Chicago.....	21 00	22 10	8 11
Do.....	St. Louis.....	23 35	27 55	9 30
Chicago.....	Minneapolis.....	10 17	11 24	4 48
Do.....	Omaha.....	11 20	12 45	5 30
St. Louis.....	Kansas City.....	7 10	7 25	3 06
Do.....	Fort Worth.....	24 00	26 10	7 25
Do.....	Omaha.....	12 14	13 26	4 42

The success obtained in the operation of the Air Mail Service during the fiscal year ending June 30, 1918, led to an important extension of the service from New York to Chicago. This route is operated in two sections, (a) New York to Cleveland, and (b) Cleveland to Chicago, and results in the expedition of the delivery of letters from New York by 16 hours to the Middle West and 24 hours to the principal Pacific Coast cities.

NEW YORK-CLEVELAND ROUTE.

The air distance from New York to Cleveland is 410 miles and the time of transit is from $4\frac{1}{2}$ to 5 hours. The rail distance is 620 miles and the time of transit from 13 hours and 5 minutes to 17 hours and 20 minutes. On this leg of the journey letters at the rate of 5,000,000 a year are carried westbound, and at Cleveland the Chicago Gateway mail is placed on New York Central train No. 35, resulting in expedition of the mail to the Middle West States by 16 hours and to the Pacific Coast by 24 hours. Eastbound the plane bound from Cleveland to New York takes approximately 14,000 letters daily from the train that left Chicago at 11 p. m. the night before and delivers these letters in New York in time for the afternoon carrier trips, thereby effecting a saving of 16 hours in delivery in New York city. Had these letters continued on their train they would not have reached New York until the following morning.

CLEVELAND-CHICAGO ROUTE.

The air-line distance between Cleveland and Chicago is 325 miles and the time of transit is about $3\frac{1}{2}$ hours. The distance by rail is 340 miles and the time of transit 6 hours and 55 minutes to 10 hours and 30 minutes. On the leg from Cleveland to Chicago westbound letters at the rate of approximately 5,000,000 a year are taken from train No. 19, which left New York at 5.31 o'clock in the afternoon before, and are deposited in the post office at Chicago usually about 1 o'clock in the afternoon in time for all city carriers. This effects a saving of 16 hours in the delivery of the letters in Chicago, as train No. 19 would not reach that city in time to make delivery until the following morning. Eastbound from Chicago approximately 5,000,000 letters a year are carried to Cleveland, where the Twentieth Century train is overtaken, resulting in the mail being delivered in New York City at 9.40 the following morning, the gain in delivery of the mail in New York City and the New England States being 16 hours.

NEW YORK-WASHINGTON ROUTE.

The air distance on the New York-Washington route is 218 miles and the time of transit $2\frac{1}{2}$ to 3 hours. The rail distances is 226 miles and the time of transit 5 hours to 6 hours and 20 minutes. On this

route mail originating in New York City late at night and in the New England States up to 10 o'clock at night is delivered by planes in the city of Washington in ample time for all carrier deliveries that afternoon. The immediate result of this service has been the elimination of the constant complaints that it took two days for the night mail from Boston to be delivered in the city of Washington. These delays were beyond the control of the Post Office Department, having been due to uncertain train connections and to the transfer of the mail across New York City from one railroad station to another. Northbound the mail is taken from Southern train connections at Washington and delivered in New York in time for the afternoon carriers. If this mail had remained on the trains it would have reached New York City too late for carrier delivery on that day.

MAGNITUDE OF DAILY OPERATIONS.

On the three routes as now established, shown by chart which follows, there are in the air daily eight aeroplanes each with a capacity of from 14,000 to 16,000 letters. These eight planes fly an aggregate of 1,906 miles each day carrying at the rate of more than 30,000,000 letters per year. On each of the three routes the mail is advanced 16 hours in each direction and in the case of mail destined for the Pacific coast the advance in delivery is 24 hours.

The cost of operation of the Air Mail Service during the fiscal year ending June 30, 1919, was \$166,402.52, and the revenue from the sale of special rate aeroplane stamps was \$194,831.50. The cost of operation includes depreciation at the rate of $33\frac{1}{3}$ per cent, which the operations of the service so far indicates to be ample, and an interest-on-investment charge of 6 per cent.

AIR MAIL'S CONTRIBUTION TO AVIATION.

The principal mechanical development during the year was the salvaging of a large number of Army war planes rendered surplus to the Army on the conclusion of the war. Another development was the creation by American aeronautical engineers and the air mail staff of the Post Office Department of distinctive mail carrying planes with from three-fourths of a ton to 2 tons letter capacity. With these planes in operation during the fiscal year ending June 30, 1920, the department, by reason of the quantity of mail carried and the speed of the plane, will save in car distribution space twice the amount of the cost of the Air Mail Service. Still another important development was the creation by the Bureau of Standards, at the request of the Post Office Department, of a radio signal device that will guide an aviator in any kind of weather direct to the center of his landing field.

In other respects the daily operation of the Air Mail Service has contributed signally to the advancement of aviation, notably in the perfection of aeroplane compasses, radio direction-finding devices and spark plugs for powerful high-compression motors.

WORLD'S ONLY SUCCESSFUL AERIAL SERVICE.

The Air Mail Service of the United States is the only practical commercial aeroplane service in the world. No service in foreign countries compares with it in magnitude, in continuous dependability and in benefits to commerce. Its record of performance during the fiscal year of 1919 was 96.54 per cent, and this record was obtained with more than 30 per cent of the trips made in rain, fog, mists or other conditons of poor visibility. The operation of the service by months for the fiscal year ending June 30, 1919, is given in the accompanying table.

During the fiscal year just closed there has been one fatal accident to a pilot carrying the mail. This was on May 25, 1919, at Cleveland, Ohio, when the pilot fell from his machine which had caught fire and after he had successfully piloted it down to a good field to within 200 feet of the ground. In addition to this fatality a mechanic was fatally injured by being struck by a whirling propeller of an aeroplane on the ground, and an applicant for a position of mail pilot was killed in the fall of his plane while attempting to demonstrate his fitness as a pilot in the service. During the year there was but one serious case of injury, the pilot, however, returning to duty after several weeks in the hospital; while not above 8 or 10 minor injuries, such as bruises, were reported in cases where aviators had made forced landings on poor fields. This record for daily operation in all kinds of weather and for long distances across country has been accepted as demonstrating the real absence of danger in straight commercial flying as compared with the more hazardous performance in exhibition or military flights. It has resulted in the assumption of insurance risks for airplane accidents and casualties by certain insurance companies of the country.

REDUCTION IN RATES OF AIR MAIL POSTAGE.

With the creation of the large weight-carrying planes for the mail service, consideration was given to a reduction of the air-mail postage rate to the regular rate for all first-class mail matter, namely, 2 cents per ounce or fraction thereof, as with the large planes the saving in car distribution space on the railroads will more than pay the cost of the air-mail service. This economy in letter transportation for long distances by aeroplanes over the cost of distributing the mail on the trains is made possible by the fast transit by air which enables the distribution of letters in the post offices instead of on the trains.

Consolidated statement of operations of air mail service, July 1, 1918, to July 1, 1919.

Month.	Trips possible.	Trips attempted.	Trips defaulted.	Weather encountered.		Mileage possible.	Miles traveled.
				Trips in fog, etc.	Trips clear.		
1918.							
July.....	108	106	2	41	67	12,150	11,855
August.....	109	109		17	92	11,988	11,984
September.....	100	100		36	64	10,900	10,900
October.....	108	108		24	84	11,772	11,617
November.....	104	102	2	24	80	11,336	11,118
December.....	104	91	13	50	54	10,896	8,415
1919.							
January.....	108	92	16	53	55	11,772	9,653
February.....	97	92	5	42	55	10,554	9,307
March.....	106	102	4	34	70	11,554	10,699
April.....	107	105	2	32	75	11,682	11,105
May.....	160	156	4	70	86	23,296	22,578
June.....	224	224		88	136	30,943	30,835
Total.....	2,698	1,387	48	511	918	166,843	160,066

Month.	Per cent of per- formance.	Mails carried (pounds).	Cost of service.	Forced landings due to—	
				Motor.	Weather.
1918.					
July.....	97.57	16,967	\$10,001.46	4	4
August.....	99.96	16,588	9,555.67	1	1
September.....	100.00	15,200	9,638.74	2	1
October.....	98.68	16,788	9,841.76	2	0
November.....	98.07	16,854	10,673.68	.....	1
December.....	77.23	17,778	13,300.46	7	11
1919.					
January.....	82.00	18,105	13,741.58	1	5
February.....	88.18	15,489	13,645.16	6	8
March.....	92.59	17,531	13,880.29	5	5
April.....	95.06	16,677	13,516.44	2	7
May.....	96.92	26,627	17,715.66	2	6
June.....	99.53	35,647	30,891.62	4	4
Total.....	96.54	230,251	166,402.52	36	53

SECOND-CLASS MATTER.

The weight of newspapers and periodicals mailed as second-class matter by publishers and news agents during the year at the pound rates of postage and free in the county of publication aggregated 1,182,297,966 pounds. This was a decrease of 47,411,389 pounds, or 3.86 per cent, as compared with the mailings of the preceding year. The postage collected on such mailings amounted to

\$16,065,947.76, an increase over the previous year of \$4,353,879.58, the increase being due to the higher postage rates which became effective July 1, 1918, under the provisions of the act of October 3, 1917.

These rates constituted the first of a series of graduated annual increases beginning July 1 each year and reaching the maximum on July 1, 1921. The rates in force from July 1, 1918, to July 1, 1919, were as follows: On the portions of publications devoted to matter other than advertising $1\frac{1}{4}$ cents a pound; on the advertising portions, first and second zones, $1\frac{1}{4}$ cents a pound; third zone $1\frac{1}{2}$ cents a pound, fourth zone, 2 cents a pound; fifth zone, $2\frac{1}{4}$ cents a pound; sixth zone, $2\frac{1}{2}$ cents a pound; seventh zone, 3 cents a pound; eighth zone, $3\frac{1}{4}$ cents a pound. Where the space in a publication devoted to advertisements did not exceed five per cent of the total space the entire publication was chargeable only with the flat rate for matter other than advertising, the zone rates not applying. Publications maintained by and in the interest of religious, educational, scientific, philanthropic, agricultural, labor or fraternal organizations not conducted for private profit enjoyed the special rate of $1\frac{1}{8}$ cents a pound, this rate applying to both the reading and advertising portions of such publications.

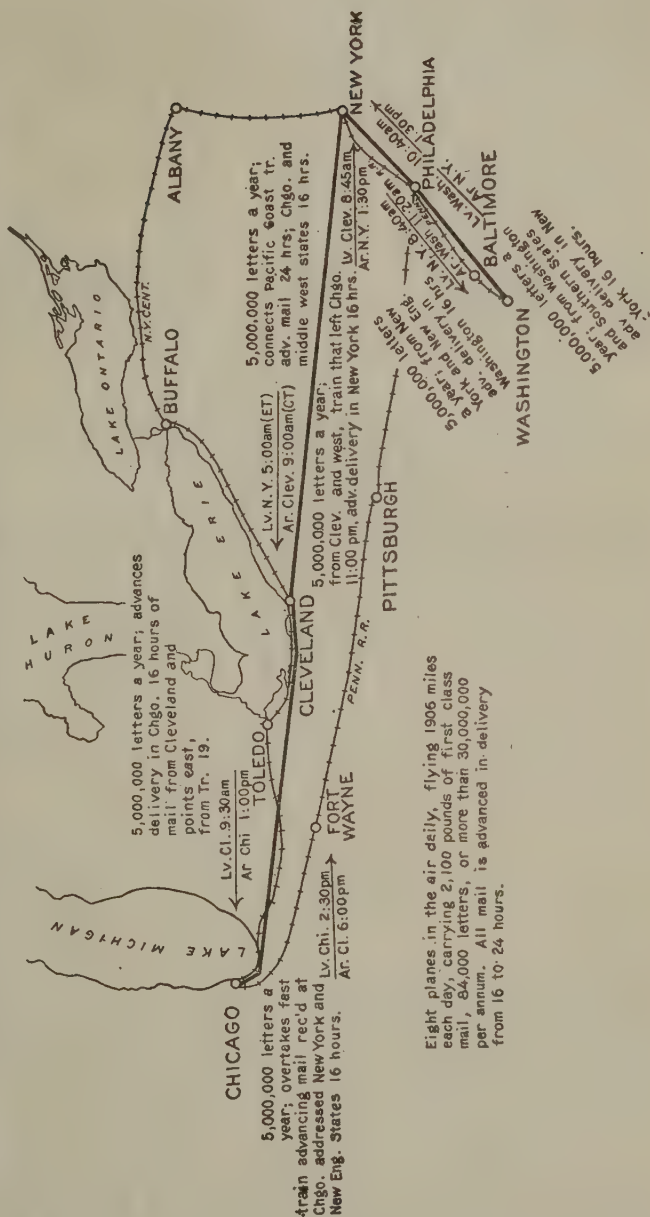
The weight of the advertising portions of publications which were chargeable with the zone rates aggregated 452,476,476 pounds, and the postage on such portions amounted to \$7,839,302.79. On the remainder of the mailings subject to postage, consisting of the non-advertising portions of publications whose advertising portions were subject to the zone rates, and of the entire portions of publications chargeable with the flat rate, \$8,226,644.97 postage was collected. The total postage collected at the new second-class rates was \$4,807,774.28 greater than the amount that would have been chargeable on such mailings at the former flat rate of 1 cent a pound. A table showing the weight of mailings of second-class matter, by States, will be found in the appendix to this report.

At the close of the year there were 10,391 post offices at which newspapers and periodical publications were entered as second-class matter. Fifty of these offices having the largest mailings of such matter collected 76.6 per cent of the total postage paid at the pound rates.

During the year 3,304 applications were received for the admission of publications to the second class of mail matter, or for change in title, frequency of issue or office of publication, of which 2,829 were favorably acted upon and 475 denied. During the same period 3,987 publications were discontinued, leaving 27,440 publications having a second-class status at the close of the year, a decrease of 1,158 as compared with the previous year. On June 30, 1919, the

AIR MAIL SERVICE

New York and Washington Route, established May 15, 1918 — 210 miles by air, $2\frac{1}{2}$ to 3 hours; 226.80 miles by rail, 4:57 to 6:20 hours.
 New York and Cleveland Route, established July 1, 1919 — 410 miles by air, $4\frac{1}{2}$ to 5 hours; 620.64 miles by rail, 13:05 to 17:20 hours.
 Cleveland and Chicago Route, established May 15, 1919 — 325 miles by air, $3\frac{1}{2}$ to 4 hours; 340.28 miles by rail, 6:55 to 10:30 hours.



number of outstanding news agents' permits to mail second-class matter at the pound rates was 1,984.

The question of effecting an equitable readjustment of the postage rates on second-class matter constituted for many years a most perplexing one. The nominal flat rate of one cent a pound which was in force for more than 30 years manifestly covered merely a fraction of the cost of handling and transporting such matter and the mailings of newspapers and other periodical publications of the second class increased from year to year until they formed over 60 per cent of the aggregate of all domestic revenue-producing mail, yet contributed less than 5 per cent of the postage derived from such mail.

Year after year the department called attention to the necessity for revising the second-class rates of postage. The subject was carefully investigated and considered by a commission created in 1911 under a joint resolution of Congress, of which former Justice Hughes was chairman. This commission found that the cost of handling and transporting second-class matter was several times greater than the postage received therefrom and recommended an increase in the rate on such matter. Finally the difference between the revenue from this class of mail and the admitted cost of its transportation and handling became so great, and the proof thereof so conclusive, that remedial legislation could not with justice longer be deferred. Then, too, the entrance of this country into the great World War and the consequent urgent need for additional revenue made it imperative that every possible source be utilized. Accordingly, Congress, in dealing with many other questions appealing to the patriotism and sense of fairness of the people, provided in the act of October 3, 1917, for the increased rates of postage for second-class matter now in force.

It will be noted that the long-established policy of encouraging the dissemination of information and thus increasing the knowledge and well-being of the people has been continued, the law readjusting the second-class rates providing for a maximum increase of but one-half cent a pound on the news and editorial or educational portions of publications and confining the larger increases, spread over a number of years and graduated according to zones, to the advertising or commercial portions. In view of the continuance of a clearly non-compensatory nominal flat rate for the educational portions of second-class matter and the fact that the zone rates on the commercial or advertising portions even when they reach their maximum will not exceed the cost assignable to the latter portions alone, it is obvious that a considerable loss will still be entailed by the Postal Service in handling and transporting second-class matter.

The Hughes Commission found the cost of handling and transporting second-class matter in the case of mailings at the cent-a-pound rate was approximately $5\frac{1}{2}$ cents a pound, exclusive of certain

expenses, principally for services in post offices, which, because of the limited information regarding them, the commission did not assign. The department's estimate of the cost of handling and transporting this matter, including the expenses which the commission did not assign, was approximately 8.27 cents a pound. On the basis of the department's estimate at that time, which includes the unassigned expenses, the loss incident to handling and transporting second-class matter during the fiscal years 1918 and 1919, would be as follows:

	1918	1919
Pounds mailed at pound rates and free in county.....	1, 229, 709, 355	1, 182, 297, 966
Estimated expense of handling and transporting.....	\$101, 696, 963	\$97, 776, 041
Amount of postage received.....	\$11, 712, 068	\$16, 065, 947
Estimated loss in handling and transporting.....	\$89, 984, 895	\$81, 710, 094

Since the cost of transporting free-in-county matter is somewhat less than the cost of transporting matter mailed at pound rates, and also on account of economies and improvements in the service, the estimated loss as above shown may be reduced \$15,000,000 for each year, thus making the estimated loss in handling and transporting second-class matter during the fiscal year 1918 \$74,984,895, and during the fiscal year 1919 \$66,710,094.

In accordance with the law the maximum rates of postage on second-class matter will not become effective until July 1, 1921, and even then second-class mail will continue to be handled at a loss to the Government of more than \$50,000,000 annually, which must be paid either by taxation or by the users of the other classes of mail through excessive postage rates.

Some of the magazines and periodicals devote so much space to advertising that they are fast commercializing their publications and are really becoming trade journals.

It is estimated that in various issues of one publication the publishers receive for the advertising contained therein more than \$800,000, and in one particular issue it is estimated that the advertising matter at the prescribed rates would amount to more than \$1,500,000; yet the transportation and handling of a single issue of this publication costs the Government approximately \$160,000 more than the postage paid thereon.

Some publications have gone so far as to print entire catalogues of business concerns as a part of an issue, endeavoring in this way to distribute it for the industry at a much lower rate of postage than would otherwise have been paid.

It is not only unfair, but unjust to the other users of the mails that such publishers should enjoy this indefensible subsidy on a busi-

ness which yields such large returns, having the loss to the Government for the transportation and handling of their publications met through excessive postage rates on other classes of mail, or paid by drafts on the Treasury of the United States.

The Postmaster General has always believed that a low, flat rate of postage should apply to reading matter, for the reason that its primary purpose is the dissemination of news and is educational, but he is also firm in the belief that this low rate of postage should not apply to that portion of the publication devoted to advertising or commercial uses. The law which fixes a zone rate for advertising matter is eminently fair, as the rate of postage is increased in the proportion that the publication is commercialized and according to the distance it is transported; and the publisher, therefore, to a certain extent fixes for himself the rate of postage on his publication. There is no reason why advertising matter when carried in a magazine or other publication should be carried at a lower rate of postage than when sent out by the individual. Such matter should pay the Government the full cost of its transportation and handling, and for that reason, and in justice to the users of other classes of mail, the Postmaster General earnestly recommends that action be taken by Congress to increase the rate of postage on the portion of publications devoted to advertising, sufficiently to pay the cost of transporting and handling same.

CORRECTION OF ABUSES OF THE SECOND-CLASS MAIL PRIVILEGE.

A practice, which was an abuse of the second-class mail privilege, grew up among some publishers of offering with subscriptions to their publications premiums and other extraneous inducements of such value as to reduce the price of the subscriptions to such an extent as to make the rate for them merely nominal or free. Agents of some publishers solicited subscriptions at greatly reduced prices, the agents being permitted by the publishers to retain the greater part, frequently the entire amount paid by the subscriber, while in other cases they were paid a bonus in addition for each name turned in. The same procedure was followed by some publishers in connection with subscriptions solicited by agents under a combination of several publications in a so-called club offer at merely a nominal rate. These methods of obtaining subscriptions, resulting in greatly inflated circulation on which increased advertising rates were based, constituted a flagrant abuse of the second-class mail privilege and served to swell the amount of second-class mail, which is carried at a heavy loss.

It is provided by the act of March 3, 1879, that a publication, to be entitled to entry as second-class matter, shall have a "legitimate list of subscribers" and shall not be "designed primarily for adver-

tising purposes, or for free circulation, or for circulation at nominal rates," the act clearly indicating the purpose of Congress that publications having the second-class mail privilege shall be circulated in response to a genuine public demand based on their merits. Therefore, for the purpose of correcting the abuses referred to, paragraph 3, section 419, Postal Laws and Regulations, was amended on March 30, 1917, so as to set forth more clearly the prohibition of the statute respecting circulation at nominal rates. To this end the regulation provides that subscriptions are regarded as at a nominal rate when a reduction is made to the subscriber of more than 50 per cent of the regular advertised subscription price, and also when they are obtained through agents on commission or in connection with clubbing arrangements with other publications when the amount received by the publisher, after deducting a commission or rebate or through other arrangements, is less than 50 per cent of the amount at the regular advertised price. This regulation has gone far toward placing the circulation of publications on a higher plane, and has met with the hearty approval of the vast majority of publishers who were glad to be relieved of the unfair competition which formerly existed.

In the administration of the law governing second-class matter it has been found necessary to revoke the second-class mail privilege of some publications because their contents consisted more or less of matter which was nonmailable under the espionage and other laws, and which, therefore, removed them from the class of publications entitled to that privilege.

POSTAL TELEGRAPHS AND TELEPHONES.

The President has heretofore transmitted to the Congress the report of the Postmaster General relating to the Government control of the wire systems, as was directed by the act of July 11, 1919, and reference is made to such report for the details of information relating to such Government control.

For a number of years the Postmaster General has advocated the Government ownership of the telegraph and telephone systems and has urged that they be blended with and become a part of the Postal Establishment, as essential agencies of communication. He is firmly convinced if such a policy were entered upon that where there are now two or three telegraph and telephone pole lines, and sometimes four, occupying the same highway and entailing immense waste, better and cheaper service could be given by one coordinate wire agency; that by the abolition of various supervisory forces of the wire systems which would then be unnecessary; by complete unification of the systems, thereby eliminating the operating cost of the useless system; by thoroughly coordinating the remaining telegraph and telephone

services; by the consolidation of offices and the utilization of post-office buildings where practicable; by the use of stamps as a means of eliminating costly and complicated accountings and the utilization of the auditing and accounting forces of the Post Office Department, thereby largely eliminating those of the wire systems, that such savings could be effected that would enable those in authority, during normal times, to materially reduce the cost of the wire service to the people.

As to the wisdom of this course the Postmaster General has not changed his views. At the time the Government took over the control of the wires extraordinary and abnormal conditions existed, resulting in a constantly increasing and very high operating cost, which necessarily continued during the entire period of governmental control. The early coming of the armistice, the accentuated cost of operation and diminishing revenues, the uncertainty in the period of Government control, presented such a situation that those in charge for the Government were able to accomplish but little by way of unification or to go forward with their policies of economy, and consequently were soon brought face to face with a very serious, but quite simple problem—increasing cost of operation with diminishing revenues. There could be but one answer—increase of rates. This action was taken. It was quite unfortunate and was taken with deepest regret, but it was imperative. To an intelligent mind this increase of rates constitutes no sound reason for a change of view on the original proposition that it is economically wise for the Government to own the wire systems as a part of the Postal Establishment, and in no sense tends to refute the soundness of the contention that through such ownership savings would be effected that would result in a reduction of rates. For example, street car companies and other public utility organizations throughout the country which are being operated under private control are in many cases on the verge of bankruptcy and are petitioning for an increase in rates for their services; and, when having been granted the increases sought, often return with petitions for still further increase, basing their claims upon the higher wages and increased cost of material. The Wire Administration could not escape this condition which extended throughout the country in relation to every form of service, public or private.

There is quite a difference between Government ownership of the wire systems as a part of the Postal Establishment and Government control for a limited and very uncertain period. The recent temporary control affords no more a test of the virtues of Government ownership than could be had through a temporary receivership in a court proceeding.

That the contention of the Postmaster General for a complete unification of the various wire systems is both wise from an economic standpoint and supported by sound business principles has been confirmed by the ablest experts on electrical transmission in America. That it should be brought about the Postmaster General still believes, through Government ownership and operation as a part of the Postal Establishment, and to that end renews the recommendations in previous annual reports that the telephone and telegraph systems of the United States be incorporated into the Postal Establishment.

COMPENSATION TO RAILROADS.

When this administration took charge of the Postal Service in 1913, the payment for carrying the mails on railroads was made under the act of 1873 and amending acts, and was based on an inflexible and illogical system of quadrennial weighings. Such a system was antiquated and had long been considered unsatisfactory. After a long and earnest struggle, legislation was obtained enabling the Government to pay for the transportation of the mails on what is commonly called "the space-basis plan."

This plan of payment of railroad companies for carrying the mails, with certain variations, had been approved by every commission which had studied the matter from the Hubbard Commission in 1878 to the Bourne Commission in 1913. The railroad companies, however, had been able to prevent any change from the weight-basis plan. On August 12, 1911, Postmaster General Hitchcock transmitted to Congress a plan of payment based on space and urged its adoption. No action was taken on his recommendation.

On February 12, 1914, the Postmaster General transmitted a complete scheme of payment based on space and actively championed it before the Congress. He succeeded in having it embraced in the pending Post Office appropriation bill in the spring of 1915. The organized opposition of the railroad companies was able to prevent passage of the bill prior to adjournment of Congress on March 4 of that year, so that for the first time in its history the entire Postal Service was compelled to operate for the ensuing year under the handicap of a joint resolution extending the previous year's appropriation.

The space-basis plan was finally authorized by Congress on July 28, 1916, and has been in operation since November 1, 1916. It is a scientific and businesslike method of railway mail pay and enables the department to pay for what it receives and the railroads to receive what they earn, which was not possible under the old system of average weights taken once in four years.

The new system enabled the department to carry out extensive reforms in the service, with the result that whereas the cost for trans-

porting the mails by railroads for the fiscal year ending June 30, 1916, was \$62,176,943.05, the cost for this service for the fiscal year ending June 30, 1919, with a largely increased volume of mail, was \$54,563,534.49. The department also as a direct result of the advantages of the new system, during the critical transportation period of the war, was enabled to remit to the railway companies for other transportation work 72,906,490 car miles per annum no longer needed for mail transportation. This, reduced to a 60-foot car basis, means 15 trains of 10 cars each, running every day between Chicago and New York. This great saving was accomplished through scientific loading of cars, rational rearrangement of letter distribution on cars, and elimination of dispatches of mail at periods when such dispatches by reason of trains not making direct connections failed to expedite the delivery of mail. So carefully were plans of the Post Office Department worked out and so flexible was the new system of space that during the trying war period, notwithstanding it was subjected to the severest test, when the freight and express agencies broke down and laid embargoes on shipments practically throughout that period, the Post Office Department was the only transportation medium that functioned unrestricted and transported not only the great normal parcel-post load but an immense additional parcel-post load thrown upon the department through the internal breakdown of these other agencies. This tremendous task was performed without interruption and with dependability and dispatch, except in so far as it was handicapped by the very irregular train schedules, and the reduction of train speed and withdrawal of trains by the railroads as necessitated by the exigencies of the war.

The amount expended out of the appropriation "Railroad transportation, 1919," for the transportation of the mails was \$54,563,534.49, as indicated by adjustments to November 12, 1919.

The following statement shows the scope of the authorized service on space and weight basis routes combined, as of June 30, 1919: Number of routes, 2,897; length of routes, 259,580.70 miles; annual travel, 519,674,375.69 miles (excluding emergency service); annual rate of expenditure, \$51,086,238.68; average rate of cost per mile of route, \$196.80; average rate of cost per mile traveled, 9.83 cents. (Detailed tabular statement will be found on page 185 of this Report, Table 22.)

The annual rate of regular authorizations on "space basis" routes, which, on June 30, 1918, was \$52,022,070.43, had, on June 30, 1919, been reduced to \$49,918,031.16. The lowest annual rate of authorized service since the inauguration of the space-basis system—\$47,706,842.46—was reached during the December quarter. It is obvious, therefore, that transportation requirements have been gauged and adjusted to the needs of the service. The annual rate

steadily increased during the June quarter, responsive to postal necessities, as indicated by the increase in the authorizations for the carriage of emergency and excess mails, space units being regularly authorized when emergency requisitions were repeated within given periods of time.

HEARINGS BY INTERSTATE COMMERCE COMMISSION ON QUESTION OF RAILWAY MAIL PAY.

In the investigation before the Interstate Commerce Commission as authorized by Congress into the question of the proper basis for paying railroads for carrying the mails, and as to the fair and reasonable rates for such service, extensive hearings were held in Washington on November 4, 1918, January 7, and from April 8 to May 6, 1919. At these hearings the department submitted the results of the inquiry made during the statistical period agreed upon and other evidence in support of the initial statement filed by the Postmaster General. The railroads also submitted their exhibits and offered their testimony. Thereafter the case was briefed and argument made before the full commission. The department believes that the space basis plan has been thoroughly justified, and that its contentions with reference to rates have been sustained. The decision and order of the commission is looked for at an early date.

MAIL TRANSPORTATION BY ELECTRIC CARS.

There was a slight decrease in the authorized service by electric-car routes during the year, owing to the extension of the Government-owned motor vehicle service in cities, and also to the cessation of war industries.

In pursuance of the act of Congress of July 2, 1918, the Interstate Commerce Commission instituted hearings for the purpose of fixing the fair and reasonable rates and compensation for the transportation of mails by urban and interurban electric railway common carriers and the service connected therewith, and to prescribe the method for ascertaining such rate or compensation. Accordingly proceedings were begun, and between June 9 and August 4, 1919, hearings were held in 18 of the principal cities of the country, representing the electric-car line centers. The results will be presented by the representative of the department and of the railroads to the Interstate Commerce Commission, with appropriate recommendations for fair rates.

SHIPMENTS OF BLUE-TAG MAIL BY FAST FREIGHT.

During the fiscal year the total shipments of periodicals (blue-tag matter) by fast freight consisted of 2,684 carloads, weighing 103,324,991 pounds, at a cost of \$866,639.63, being a decrease of 820

carloads, aggregating 16,630,046 pounds, and an increase of \$73,064.14 in freight charges, respectively, as compared with the business of the previous year. The cost of carrying this matter had it moved in the regular mails would have been approximately \$1,365,497.28. A saving to the department of approximately \$498,857.65 was therefore effected.

Of these shipments 2,598 carloads of a total weight of 99,031,448 pounds were moved over rail routes, or an average weight of 38,126 pounds per car. This is a decrease of approximately 6,434.100 pounds in the total weight, and an increase of approximately 4,126 pounds in the average weight per car as against the movements of the previous year. The cost of transporting the shipments, including freight, cartage, loading, handling, and other incidental charges was \$842,819.09, being an increase of \$70,050.32 over the amount expended for this purpose in 1918. This additional cost is due not only to the increase in freight rates allowed by the Interstate Commerce Commission, but also includes the greater expense in hauling, loading, and unloading the shipments, etc., due to other economic conditions.

In addition to the all-rail shipments of periodicals, mail matter originating at New York, Philadelphia, and New England points for the State of Texas was transported via steamer routes between New York and Galveston. A total of 4,274,543 pounds were transported in this manner during the fiscal year 1919, at a total cost of \$23,820.54, representing a decrease of 215,946 pounds, and an increase of \$3,013.82 in freight charges as against the figures for the fiscal year 1918. This increase was due to the higher rate allowed the steamship companies.

Since the cessation of the war activities the railroads have been able to maintain their schedule of fast-freight movements with regularity, and but few complaints of delays have been received which were attributable to the movement of this matter by freight. Twelve requests were received during the year from publishers for exemption of their publications from the blue-tag freight movement, seven of which were approved by the department.

RAILWAY MAIL SERVICE.

The distribution of circulars and catalogues practically has been eliminated from the working mail cars, the distribution being done in post offices and terminals at points of origin or delivery, and the distribution work on the trains has been concentrated on letters and daily newspapers. The result has been that although the mails have increased greatly since 1913, the Railway Mail Service in 1919, on trains and in terminals, has had less "stuck," left over, unworked mail than at any time in the history of the service.

The steady upbuilding of the personnel of the Railway Mail Service has been one of the accomplishments of this postal administration. The improvement of the type of the men in the service through the elimination of the shirking and disloyal element, the reduction of the long hours of continuous duty on trains, the increase of steel car construction for the safety of the clerks, and the steady increase of the annual rate of pay of railway postal clerks have been some of the notable developments in the Railway Mail Service since 1913.

At the close of the fiscal year ending June 30, 1913, there were in the Railway Mail Service 18,265 employees, and their annual average salary was \$1,239. On June 30, 1919, there were on the rolls of the service 19,683, and their average annual salary was \$1,573. By reason of the annual promotions which fell due immediately after the close of the fiscal year just ended, the average annual salary of the railway postal clerks rose to \$1,654, an average annual increase of \$415 per employee since June 30, 1913. These salary increases do not include the travel allowances given to approximately 13,000 road clerks. This average annual travel allowance was \$92 on June 30, 1913. It has increased to an average of \$114 per annum on June 30, 1919, and to \$190 per annum on September 30, 1919.

In the matter of providing safe car construction for the railway postal clerks great strides have been made. Since June 30, 1913, wholly wooden mail working cars were reduced from 3,444 to 718; steel underframe cars were increased from 322 to 762; and wholly steel cars were increased from 354 to 2,002.

The reorganization of space and personnel in the Railway Mail Service which occurred about two years ago has become fully adjusted to the needs of the service and the result is the complete efficiency of the past year.

Notwithstanding the disruption of railroad schedules the Railway Mail Service has functioned perfectly. The proof of this is that there was less unworked mail in the Railway Mail Service during the year than in any previous year of which there is a record, and a comprehensive investigation has shown that no serious delay to mail of any character occurred in the Railway Mail Service during the year. Unnecessary terminals have been eliminated and the others have been strengthened and brought to a higher degree of performance with a marked improvement in the handling of parcel-post and circular matter.

Since the conclusion of the war there has been a gradual improvement in the operation of railroad train schedules. A number of the trains which were withdrawn or discontinued during the war period have been restored, and the schedules of others have been shortened and otherwise modified, so as to furnish better connections for the transmission of mails. The passenger-train service, however,

is not as efficient as it was prior to the war and there is still an insistent demand on the part of the business interests throughout the country for adequate service. It should be stated that the railroad companies are now more responsive to the demands of the business interests and the Post Office Department, and it is hoped that shorter schedules will be put into effect and additional trains provided as rapidly as circumstances will permit. It should be added that the postal transportation service is limited to the facilities afforded by passenger-train service, over which the Post Office Department has no control.

PERSONNEL IN RAILWAY MAIL SERVICE.

The return from military duty of many former employees was followed by a marked improvement in the efficiency of the Railway Mail Service. The service, however, is not yet adequately manned with experienced help, but there is a steady increase in the number of appointments. There were 1,103 resignations of regular clerks, or 5.6 per cent of the total force. This represents a decrease of 142 in the number reported for the fiscal year ended June 30, 1918.

From the force of substitute employees there were 1,318 resignations from a total force of 2,754, or 47.8 per cent. During the year 2,717 eligibles certified by the Civil Service Commission declined appointment. The civil-service registers of eligibles were exhausted in a number of States, which, added to the difficulty of getting those on the registers to accept appointment, rendered it necessary to employ a large number of temporary, noncertified employees.

INCREASE IN SALARIES OF RAILWAY MAIL SERVICE EMPLOYEES.

The act making appropriations for the Postal Service for the fiscal year ended June 30, 1919, provided for increased compensation to railway postal clerks of \$200 for each grade, but it was also provided that no promotions should be made during the year. The appropriation act for the fiscal year 1920 continues the \$200 increase in each grade and also authorizes promotion in practically all grades below the maximum grade. The promotion rules have been made as liberal as possible, and during the fiscal year 1920 approximately 97 per cent of the clerks who have not already reached the maximum grades will be promoted. In addition to the liberal promotion standard the allowance for travel expenses was increased by the Congress from \$1.20 per day to \$2 per day.

OPERATION OF RAILWAY MAIL SERVICE.

On June 30, 1919, the supervisory force of the Railway Mail Service consisted of 15 division superintendents, 15 assistant division superintendents, 2 assistant superintendents, and 112 chief clerks.

There were 17,916 railway postal clerks (including 526 unassigned) and 1,625 acting railway postal clerks; a net decrease in the number of employees at the close of the year of 481, as compared with the number in the service at the close of the previous fiscal year. The net decrease in the total force is due to an increase of 520 in the regular force and a decrease of 1,001 in the unassigned and acting employees.

Railway post-office service was in operation on 217,873 miles of railroad, with 272,413,940 miles of annual travel.

There were 8,784,220,700 distributions and redistributions of pieces of first class and 6,177,846,279 distributions and redistributions of pieces of second, third, and fourth class matter, a total of 14,962,066,979 distributions and redistributions of pieces, exclusive of registered matter, by railway postal clerks during the year, an increase of 5.85 per cent over the previous year. Of the 14,962,066,979 pieces of mail matter distributed and redistributed 14,960,885,862 pieces or 99.99 per cent were distributed and redistributed correctly.

Of registered matter there were handled and rehandled in transit 83,172,682 letters, packages and cases, 6,760,389 rotary lock pouches and sacks, 3,853,975 registered package jackets, and 353,159 lead-seal sacks. In handling the registered matter above indicated, clerks made up and dispatched 2,821,823 rotary lock pouches and sacks; 1,140,051 registered package jackets containing 8,745,055 pieces; 4,179 lead-seal sack jackets containing 195,919 pieces; and received and opened 1,228,187 rotary lock pouches and sacks; 1,017,076 registered package jackets containing 8,167,313 pieces, and 11,494 lead-seal sacks containing 137,857 pieces.

READJUSTMENT OF THE POSTAL SERVICE.

In common with practically all other activities of a kindred nature, both governmental and private, employing large quantities of labor and dependent upon railroad transportation for success during the war, the postal service unavoidably deteriorated in some localities to a certain extent from the high standard previously maintained. This was a natural and inevitable effect of the war, due to conditions over which the department had no control, including impaired train service, loss of highly trained employees, inability to obtain competent clerical assistance to fill vacancies and delay in the receipt of equipment and supplies. Coupled therewith, in addition to handling a greatly increased volume of postal business and the provision of adequate postal facilities for the great Army camps established throughout the country, the department, owing to its extensive organization, was called upon to perform for other branches of the Government innumerable duties wholly foreign to the Postal Service, but which were vital to the successful prosecution of

the war. Notwithstanding these handicaps the Postal Service was continued throughout this critical period without curtailment or restriction of any character.

The war having ceased, the foremost object of the department was not only to restore the service to its prewar status but, with the broader experience gained, to increase its efficiency to a point not heretofore enjoyed in the history of the department. In past administrations, although answering its inquiries and endeavoring to meet its complaints, the department has not shown any disposition to take the public into its confidence. Believing such a policy to be fundamentally wrong, and that the most effective means of disclosing defects and determining the necessary reforms was to establish an intimate relationship with the business interests of the country, it was decided to go before the merchant, the manufacturer, the banker, in a frank, open letter soliciting earnest cooperation in placing the service on a thoroughly satisfactory basis through honest criticism of any shortcomings and practical suggestions for betterment. With this object in view on January 16, 1919, a personal letter was sent out to all postmasters of the larger cities, about 3,000 in number, directing them to make a comprehensive survey of their offices for the purpose of developing any inadequacies of the service, and, as a part of their campaign, to get into close touch with local commercial houses and their trade bodies to ascertain the character of the postal service from the viewpoint of the business man. This was followed on January 21 by a personal letter from the department to business organizations, such as the chambers of commerce and boards of trade, as well as to individual firms and corporations, approximately 12,000 in all, setting forth the purpose of the department and requesting their close cooperation.

Replies were received from some 2,500 postmasters and 4,000 business men and organizations. While some of these naturally contained complaints regarding the service and remedial suggestions, about 92 per cent expressed themselves as being entirely satisfied with the service. Still others stated that, while there might be room for improvement, they had considered the service remarkably good, knowing the difficulties occasioned by the war which the department had had to encounter. Each of these letters was carefully reviewed, and, in addition to the necessary departmental action, under date of March 18, a circular letter was addressed to the postmasters inclosing all complaining communications received from patrons of their respective offices, and directing them to call upon the writers personally for a further discussion of the cause of complaint with a view to its correction. With a report of the action taken by them the postmasters then returned these communications to the department for a second review and further action if necessary. Many of the com-

plainants stated that the unsatisfactory service was entirely due to the loss of expert clerks and to curtailed or interrupted train service.

The success of this effort to procure the cooperation and aid of the public being so great, their responses so prompt, cordial, and sincere, as a further step in the program there was held in the department at Washington on April 1, 2, and 3, a conference of representatives of business organizations and of the Postal Service. Those in attendance, in addition to the officials of the department located in Washington, included the postmasters of the 75 largest offices representing approximately 75 per cent of the entire postal business from a standpoint of office receipts, the 15 field superintendents of the Railway Mail Service, the 15 inspectors in charge, and representatives of prominent commercial organizations of the country, as well as of a number of the heaviest users of the mails. At this conference the most frank and intimate discussions of the Postal Service were had from every angle, covering every phase of the service from the use of stamps and envelopes to the intricate problems of housing and transportation. The chief defects of the service and most common sources of criticism were exposed, remedies were debated, and the matters referred to the proper bureaus of the department for corrective action. The general result has been not only a greatly improved mail service, but the establishment of harmonious relations between the department and the business world and a clearer understanding on the part of each of the difficulties and troubles of the other.

In line with the policy already so successfully followed, on June 19 a circular letter similar in purport to those previously sent out was addressed to the principle banks of the country, embracing about 30,000, to which more than 11,000 replies were received. Of this number over 50 per cent were highly complimentary, slightly more than 25 per cent offered suggestions for improvement without direct criticism, while less than 25 per cent contained specific complaints of the service. In reviewing these letters practically the same procedure was followed, all meritorious complaints being taken up with the postmaster for discussion with the complainant and correction.

The foregoing plan elicited only individual criticisms and opinions. Consequently, in the furtherance of the program adopted at the conference in April, the Chamber of Commerce of the United States of America, at the request of the department, on July 1, 1919, addressed a circular letter to the local chambers of commerce of the 50 largest cities, requesting each to appoint a committee for the purpose of making a close, analytical study of the postal conditions with a view to determining the underlying causes of any unsatisfactory service which might exist. These committees were directed to confer

with the postmaster and, after completing their investigations, to submit detailed reports of conditions as they found them with suitable recommendations for changes when deemed necessary. Simultaneously the department informed postmasters of this plan of cooperation and instructed them to work in conjunction with the committees and to afford them every facility and courtesy for carrying on their investigations. At the same time the department and the National Chamber of Commerce established committees in Washington for the purpose of considering the reports of postmasters and the local committees and insuring closer cooperation. While only a few of the reports have as yet been received, the results thus far have been highly gratifying, and are indicative of an earnest desire on the part of both the commercial bodies and local postal officials to give the department their heartiest cooperation in maintaining an efficient service.

Not only have many helpful suggestions resulted from this plan, but the business world is daily making its cooperation more direct and personal by facing and separating the mail and posting it continuously throughout the day, supplying complete addresses, using uniform envelopes, notifying the post office in advance of heavy mailings, and utilizing precanceled stamps and the permit system, all of which tend to facilitate the work of the post office and to expedite the dispatch of the mails.

While yet in its infancy, this policy of consulting the business man regarding his requirements in the way of the postal service has been followed sufficiently to demonstrate its wisdom and benefits, and in the future it will be made a permanent feature of postal administration. Thus will the department become fully cognizant of his needs and be thereby enabled to supply the necessary service in an intelligent and effective manner, while at the same time the business man will comprehend the problems and difficulties of the department and recognize the fact that its paramount desire is to satisfy the public by rendering the best possible postal service.

POST OFFICE SERVICE.

During the six-year period from July 1, 1913, to June 30, 1919, the number of first, second, and third class offices increased from 8,406 to 10,825, or 2,419. This increase was distributed among the different classes of offices as follows:

Classes.	1913	1919	Increase.
First class.....	485	665	180
Second class.....	1,979	2,539	560
Third class.....	5,942	7,621	1,679
Total.....	8,406	10,825	2,419

In the same period the combined salaries of postmasters increased from \$14,965,500 to \$19,285,700, an increase of \$4,320,200, or 28.9 per cent.

In 1919 the total number of clerical employees, exclusive of assistant postmasters, at first and second class offices was 44,681, as compared with 35,486 in 1913, an increase of 9,195, or 25.9 per cent. The expenditures for clerical service increased from \$43,668,732 to \$74,251,888, or \$30,583,156—70 per cent.

During this period the promotions of clerical employees numbered 112,179, involving an expense of \$15,889,710. The average salary of clerical employees is now \$1,318.03, whereas in 1913 it was \$1,052.97.

The total appropriations for post-office service, including city delivery, vehicle, etc., in the Bureau of the First Assistant, increased from \$121,660,275 to \$192,334,107, an increase of \$71,673,832, or 59.2 per cent.

Prior to 1913 the work at the larger offices was divided into five principal divisions which in turn were composed of minor subdivisions or sections. It was apparent that with such a wide division of authority and supervision there must be more or less friction between the supervisory heads, loss of time through the inflexibility of the working forces, and a lack of cooperation. After thorough investigation and a close analytical study of the matter it was decided to reorganize the larger offices in accordance with sound business principles and modern methods of postal management. As a result, during the past six years practically all post offices of the first class have been reorganized on the two-division plan, thus centering under two divisional heads the duties of supervision which were formerly dispersed throughout five or more independent divisions. The results attained have more than demonstrated the wisdom of this action through economy of management, effectiveness of supervision, coordination of the work, cooperation of service, and the standardization of salaries and allowances, uniformity in methods and equipment, and interchangeability of personnel.

Experience having shown the necessity for unity of service in post offices, as well as for a line of demarcation between mail transportation and post office service and, in the latter instance, the necessity of defining the jurisdiction within cities of the First and Second Assistant Postmasters General, on July 1, 1916, by authority of Congress, the Division of Post Office Service was created in the Bureau of the First Assistant Postmaster General. This was brought about by the consolidation under one directing head of all postal activities within a city which could be classed as purely post-office service, the new organization embracing the former divisions of Salaries and Allowances and City Delivery under the First Assistant Postmaster General, together with the Screen Wagon, Mail Messenger, and

Pneumatic Tube Service which were transferred from the Bureau of the Second Assistant Postmaster General. The effectiveness of administration within the Department, as well as the results obtained in the supervision of the work of post offices throughout the country, have fully justified this action.

The appointment of the different classes of employees and the authorization of all expenditures for the maintenance of post offices are now handled jointly, thus giving a broader knowledge of the requirements of the service and insuring closer cooperation.

In the matter of authorizing expenditures for auxiliary clerical and carrier assistance, allowances are now granted on a quarterly basis, for it is impossible for the postmaster to make accurate estimates of his requirements for an entire year.

The total number of post offices in operation on July 1, 1919, was 53,084. Of this number, 10,825 were assigned to the presidential grade, 665 of which were first class and 2,539 of the second class.

The policy inaugurated in 1913 of reorganizing post offices in accordance with sound business practices and correct principles of postal management was necessarily suspended during the period of the war. However, prior thereto practically all of the larger first-class offices had been reorganized on the "two-division plan," under which all financial operations and all mail handling activities are placed under separate supervisory heads. These two chief supervisory officers are coordinate in rank and responsible directly to the postmaster. Experience during the past five years has conclusively demonstrated the efficiency and the economical advantages of the two-division system as compared with the old five-division organization, and its benefits will gradually be extended until all first-class offices are embraced, with necessary modifications as the offices diminish in size and importance.

The clerical and carrier forces of first and second class offices, including substitutes, laborers, and special delivery messengers, now comprise more than 105,000 employees. To manage this large corps and direct the work requires the services of approximately 3,500 supervisory officers, exclusive of postmasters and assistant postmasters. As indicated, the work in the larger offices is centralized under two chief supervisory heads, thus avoiding an extensive division of authority and insuring close cooperation between the two divisions, as well as among the different sections of each division.

The administration of post offices became an increasingly serious problem during the war, due to the loss of thousands of highly trained men through the military and naval necessities, and the impossibility in some instances of obtaining sufficient additional employees with the requisite qualifications. Consequently, there was some deterioration in post office personnel throughout the country,

the same as in every industrial institution. During the ensuing fiscal year the most careful attention must necessarily be given to the appointment and training of employees with a view to again building up a force of unquestioned efficiency. Coincident with the restoration of an efficient personnel the department will continue its policy of standardizing both work and methods and introducing modern and effective equipment.

The post office is essentially the people's institution. It reaches every home and comes in contact with every business concern throughout the country. Therefore, in the very nature of things, close and honest cooperation between the public and the post office is essential to satisfactory service. The advantages of such a relationship are manifold. The patron can directly serve both himself and the department by equipping his residence, and place of business with mail receptacles; posting heavy mailings early and continuously throughout the day; placing his return address on all mail; informing the post office promptly of any change of address; addressing all mail completely and legibly; properly preparing all parcels and packages for the mails, etc. Furthermore, when the postal service is not up to the standard he can render an invaluable aid by offering constructive criticisms accompanied by suggestions for improvements.

In order that defects may be remedied and inefficiency stamped out the public is being urged, both directly by the department and through the postmasters, to make known the inadequacies of the service and the derelictions of its employees in order that remedial action may be taken. On the other hand, postmasters have been instructed to explain fully to their patrons the organization of the post office and its various functions in order that they may be in position to utilize this great organization to the fullest extent and participate in its many benefits. The response of the public has been prompt and cordial, many useful suggestions have been made, and the general results of this campaign for closer cooperation and a clearer understanding have been highly gratifying.

BRANCH POST OFFICES AND CONTRACT STATIONS.

It is deemed important to again invite attention to the advisability of removing the restrictions bearing on the establishment of branch post offices. Under existing law branch offices can not be established in villages having a population of less than 1,500, or which are more than 5 miles distant from the corporate limits of the city wherein the main office is located. The advantage resulting from the operation of central accounting and nonaccounting offices demonstrates fully that the department should have greater latitude in establishing branch post offices. The removal of the restrictions respecting the

establishment of branch offices would not affect the postmasters thereof, or the service to the public, but would greatly simplify accounting methods, and, in many instances, enable the department to inaugurate City Delivery Service. Legislation permitting the department to establish branch offices without regard to the population or distances between corporate limits is again urged.

In accordance with the recommendation of the Post Office Department, Congress by act of May 28, 1916, authorized the Postmaster General to enter into contracts for the conduct of contract stations for a term not exceeding two years. This change has resulted in material advantage, both to the department and to the clerks in charge of the stations, as it saves the department the labor incident to the making of approximately 6,000 contracts every year and also insures a greater measure of permanency to the station. As the designation implies, the conduct of these stations in the nature of contract service and the selection of a location is determined to a considerable extent by the amount of compensation demanded by a clerk in charge. Recommendation was made that contracts be made for a period of four years, but Congress expressed its preference for a shorter period and authorized a two-year term.

On June 30, 1919, there were 5,170 contract stations in operation. These stations are established in private places of business in cities having post offices of the first and second classes and provide facilities for the transaction of money order, registry, and insured parcel-post business, the sale of postal supplies, and in some cases the transaction of postal-savings business and the receipt and dispatch of mail. The department looks with favor upon the establishment of contract stations, as they afford convenient facilities for the public and reduce materially the congestion at the main offices and classified stations, where, on account of the rapid growth of the parcel post and the difficulty in securing additional space due to conditions attributable to the war, the offices and stations have become badly congested.

Formerly contract stations were considered desirable assets and were eagerly sought by drug and department stores because of the increase in their business attracted by the location of postal stations in such business places and numerous stations were established in such stores at a nominal compensation, but since the beginning of the war, there has been less competition for these stations and in some instances difficulty has been encountered in securing suitable locations for new stations or for existing stations, where the clerks in charge have indicated a desire to relinquish their contract.

Many of the larger cities have foreign communities and contract stations are particularly valuable in providing postal facilities for these communities. It is the practice to secure a popular person of

the nationality concerned to serve as clerk in charge. An arrangement of this character usually results in confining the postal business of the community to the particular station, thereby relieving the main office of the necessity of securing clerks of the different nationalities with which postal business has to be transacted.

CITY DELIVERY.

In the past six years free delivery of mail by letter carriers has been established in 343 additional offices, carrying therewith the appointment of 730 regular carriers. Such establishments, coupled with the extension of free delivery in other cities, have extended this service to approximately 7,000,000 additional people.

As an indication of the extension and growth of the City Delivery Service since 1913, the expense of maintenance has increased from \$36,600,544 to \$59,527,296, or 63.1 per cent, and the number of regular carriers from 30,923 to 35,024, or 13.3 per cent. During this period carrier promotions have numbered 78,263 at a total cost of \$11,501,700. The average salaries of carriers in 1919 was \$1,305.02 as compared with \$1,087.57 in 1913.

Prior to 1913 nearly all mail in cities was delivered by foot carriers, who also made collections from street letter boxes, as the weight limit on a single piece of mail of any class was four pounds and the average weight of parcels was less than six ounces. Through the institution of the parcel post the volume of fourth class or parcel post mail has been many times multiplied until approximately 2,750,000,000 parcels are now handled annually. The average weight of parcels now exceeds three pounds with a maximum of 70 pounds. As approximately one-third of all parcels are received for delivery at city carrier offices, there has in this period been a transition in the method of effecting delivery which has necessitated the installation of an efficient and comprehensive system of motor-vehicle service.

With a view to conserving the time of carriers, avoiding excessive loads, and at the same time expediting the delivery of mails, motor vehicles have been utilized extensively in making collections and re-laying bundles of mail to the foot carriers while serving their routes.

Through encouragement and stimulation the use of private mail receptacles at residences and places of business has been greatly extended as a means of increasing the efficiency of the service, their provision now being one of the requirements for the establishment or extension of City Delivery Service.

In so far as possible in connection with local conditions, the work of carriers throughout the country has been standardized. Routes, schedules, and frequency of service in the different cities have from time to time been adjusted in order to eliminate inequalities and in-

sure uniformity of service, and modern, standardized equipment for the use of carriers has been installed.

During the fiscal year just closed City Delivery Service was inaugurated at 27 additional offices, making a total of 2,019 city delivery offices. This new service involved the authorization of 54 additional carriers and the increase in the number of carriers authorized at other offices was 431, making a total increase of 485. However, due to abnormal labor conditions, which naturally resulted in an increase in the number of resignations, and inability of the Civil Service Commission to promptly supply eligibles for appointment to fill vacancies in some instances, the total number of regular carriers actually on the rolls at the close of business June 30 was only 35,024, against 34,993 at the close of the preceding fiscal year, or a net increase of 31. It was necessary to grant auxiliary allowances in lieu of carriers which were authorized but could not be appointed for reasons stated.

While the department has followed a liberal policy in the establishment and extension of City Delivery Service, due to the decrease in available man power and other correlated causes incident to the war, the growth of the service has not been so pronounced as in former years. In no instance has the department declined to authorize the establishment of City Delivery Service where the population and volume of business transacted were sufficient and the civic requirements had been met. As a matter of fact, in a few cases where owing to unusual conditions the necessity for City Delivery Service was especially urgent, the usual requirements were waived and the service installed. Notwithstanding this liberal policy during the war and immediately following, there was a considerable reduction in the number of applications for the establishment of City Delivery Service as compared with former years, and in several instances where applications were already pending the persons interested voluntarily suggested that establishment be deferred until the close of the war. While such suggestions were not followed by the department, this attitude is indicative of the deep spirit of patriotism and self-sacrifice which prevailed among the entire American people during this period, and accounts, at least in part, for the small number of initial installations of City Delivery Service during the war.

Realizing the universal feeling in this regard and fearing that it might lead to detrimental economies, the department especially impressed upon postmasters the fact that under no circumstances must service be denied or curtailed because of war conditions, so long as the necessary man power could be obtained.

The increased use of automobiles has greatly added to the efficiency of the delivery and collection of the mail. This is especially

true with respect to the delivery of parcel-post mail, the transporting of foot carriers to their routes, and the relaying of extra bundles of mail to carriers on their routes. Thus not only is the overloading of carriers avoided but the delivery of mail is greatly expedited. The department is also experimenting in the collection of parcel-post matter from large firms which deposit mail of this class in considerable quantities, and if found to be practicable this service will gradually be extended in the larger cities. As delays in delivery inevitably result from inadequate collection service, particular attention has been given to the arrangement of collection schedules with reference to the dispatch of important mails and the prompt movement of mail for local delivery.

The effect of the war on the carrier force has not been so generally noticeable as in the case of clerks. There have, of course, been many vacancies due to carriers entering the different military and naval organizations. On the whole, however, the department has been able to maintain an adequate force through the use of temporary employees, and, in a few cases, the employment of female carriers.

While refraining from the withdrawal of service already in operation, it has been the purpose of the department to equalize the City Delivery Service in cities of corresponding size, population, train schedules, and of the same relative importance with a view to establishing uniformity throughout the country. At the same time, proper consideration has in all cases been given to any peculiar conditions or requirements which may exist, the object being to provide service for each community fully adequate to meet its needs.

PAYMENTS TO MAIL MESSENGERS AND SCREEN-WAGON CONTRACTORS.

Complying with the recommendation of the Post Office Department, Congress by act of July 28, 1916, authorized the Postmaster General to designate postmasters as disbursing officers for the payment of mail messengers and others engaged under their supervision in the transportation of mails. Acting under this authority the Postmaster General on October 1, 1916, designated the postmasters of offices showing a surplus of receipts sufficient to meet the expenditures to make payments to mail messengers and screen-wagon contractors on the first of the month following that in which service was rendered in all cases where there had been no delinquencies or omissions. This action greatly advanced payments to contractors for screen-wagon service in the 260 cities where such service was in operation and also payments to practically all of the 8,400 mail messengers of record at that time.

GOVERNMENT-OWNED CITY MOTOR VEHICLE SERVICE.

Prior to the fall of 1914 all vehicular service in connection with the transportation of mail was secured under contract. The magnitude

of the vehicle service necessary for the proper handling of mails in the larger cities was fast developing a serious situation with which the department would soon be unable to cope, except by entering into contracts at exorbitant rates. Competition for vehicle service in these cities could easily be stifled by one set of contractors through the organizations of corporations in the various States where the service was to be performed. An officer of one parent organization, which either had under contract or had submitted bids for the service in several of the most important cities, openly boasted that he would crush his competitors and soon gain control of all of the large contracts. It was found that in some instances when bids were invited for service in the very large cities the bidder could obtain a bond from only one surety company, and in order to do so it was necessary to disclose to the agent the amount of the bid, thereby affording a further opportunity for a combination between one set of bidders and the bonding company, with the object of compelling the department to pay exorbitant rates for the service required. Not satisfied with obtaining money from the department which it was entitled to receive under its contract, one company succeeded in adding many unnecessary trips to the vehicle schedule, thereby greatly increasing its compensation. It is regrettable to say that to further defraud the Government an officer of the company having this contract bribed an employee of the Postal Service to abstract from the files the reports of delinquencies and failures on the part of the company, thereby enabling it to escape the fines which otherwise would have been imposed and keep the department in ignorance of the inferior service it actually rendered. This practice was soon discovered, the conspirators prosecuted and imprisoned, and the company compelled to return to the department a compensating sum for the losses suffered.

An efficient and economic transportation service is one which meets the reasonable needs of the public at the minimum cost. To secure this combination it is essential that there shall be a coordination of the work of the various branches of the postal service coming in direct contact with the public and that the collection, distribution, transportation, and delivery of the mails within a city shall be brought under one supervisory head and conducted by those familiar with the needs of the public and interested solely in solving the postal problems in the particular city. A condition of this character is impracticable in the larger cities under the contract system owing to the division of local authority as regards the means of transportation and the divergent responsibilities and interest of the two agencies. The chief object of the contractor is naturally one of profit, while the aim and purpose of the postal officials is one of service. The contract system in the larger cities developed a constant fric-

tion between the contractor and the local postal officials, while under Government ownership that complete harmony and cooperation among the various branches in handling the mails so essential to a successful operation of any service is not only possible, but is inevitable.

In the light of the conditions hereinbefore related, the Postmaster General recommended the enactment of legislation that would permit the department to perform the vehicle service with Government-owned equipment and Congress in providing funds for screen-wagon service for the fiscal year 1915, took favorable action on the recommendation.

Government-owned motor vehicle service was first inaugurated in Washington, D. C., on October 19, 1914, and since that date the service has been extended to the following 27 cities: Atlanta, Ga.; Chicago, Ill.; Indianapolis, Ind.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; St. Louis, Mo.; Jersey City, N. J.; Brooklyn, Buffalo and New York, N. Y.; Cincinnati and Columbus, Ohio; Philadelphia, Pittsburgh and Scranton, Pa.; Nashville, Tenn.; Norfolk and Richmond, Va.; St. Paul and Minneapolis, Minn.; Far Rockaway, Flushing and Staten Island, N. Y.; Cleveland and Toledo, Ohio, and Milwaukee, Wis., service in the eight cities last mentioned having been established since July 1, 1919.

To transport the mail in the cities where Government-owned service is now in operation it requires 1,692 trucks, ranging in size from $\frac{3}{4}$ to 3 tons capacity and to operate these trucks requires the services of approximately 1,880 persons, employed as mechanics, chauffeurs, garagemen, supervisory officials, and clerks.

It is proposed to extend Government-owned service to 30 additional cities during the remainder of the current calendar year, and it is expected that 2,100 Government-owned trucks will be in use in the mail service by January 1, 1920, and that the personnel will then number 2,250 employees.

The majority of these cities in which it is proposed to establish Government-owned motor vehicle service are located in the third contract section, comprising the States of Illinois, Indiana, Iowa, Kansas, Michigan, Missouri, Ohio and Wisconsin, where the contracts for screen-wagon service and the rental of vehicles for use in the collection and delivery service expired on June 30, 1919, and the service is being conducted under a temporary extension of the contracts, which can not be continued beyond December 31, 1919.

Congress authorized the Secretary of War (act of July 2, 1918) to turn over to the Postmaster General such motor trucks and motor-truck equipment as is not suitable for military purposes, and acting under this authority, the War Department approved the transfer to the Post Office Department of sufficient motor trucks to meet the re-

sonable requirements of the Postal Service during the ensuing five years. Only a part of the trucks to be transferred are in the possession of the Post Office Department, but additional trucks are being received daily. In some instances only chassis are transferred, while in other cases chassis are delivered equipped with bodies unsuitable for use in the mail service. It therefore will be necessary for the Post Office Department to have screen bodies manufactured and mounted on the chassis before the trucks will be suitable for mail transportation. Furthermore, it has also been found necessary to make extensive alterations to some of the chassis to place them in condition to receive the screen bodies used in the mail service. The trucks received from the War Department that can not be placed in the service immediately are jacked up, blocks placed between chassis frame and axles to relieve tension of springs, pneumatic tires removed and deflated, and cylinders and other metal parts oiled, after which the trucks and parts are stored in buildings rented for the purpose. The expense of storage amounts to less than \$12 per year per truck. Tires, tubes, and other parts that deteriorate rapidly are being used in the cities where Government-owned service is now in operation, and this practice materially reduced the expenditures for motor-truck parts during the last quarter of the fiscal year ended June 30. The practice will also reduce expenditures during the greater portion of the fiscal year 1920, as sufficient tires and tubes are on hand or have been promised by the War Department to make it unnecessary to purchase any of those items except to meet emergent cases.

The Secretary of War has approved the transfer of 5,778 motor trucks and 1,087 motor cycles to the Post Office Department.

Of the motor cycles received from the war Department 284 have been assigned to post offices for use in the mail service.

Any question which may have existed as to the relative merits of Government-owned vehicle service and contract service has been dispelled, the value of Government-owned service having been thoroughly established during the period of the war, when in many instances contract service became disrupted and demoralized under the pressure of abnormal conditions. Government-owned service has been extended gradually, its installation in each particular city following only after a thorough investigation, and it is proposed to continue this practice in the extension of the service.

Congress realizing the additional burden placed upon contractors for furnishing vehicles used in the transportation of mail as the result of the unusual conditions resulting from the war, incorporated a provision in the act, making appropriations for the maintenance of the Postal Service during the fiscal year 1919, authorizing the Postmaster General to investigate conditions arising from con-

tracts in the screen-wagon and other vehicle service entered into prior to June 30, 1919, with a view to determining whether any adjustments should be made in the compensation of the contractor and to adjust the same for services and materials thereafter to be furnished in cases where the facts disclosed the necessity for such an adjustment or with the consent of the contractor and his bondsmen to cancel the contract. In compliance with the intent of the act specially instructed representatives of the Postal Service were directed to make investigations with a view to ascertaining the effects of the war upon the vehicle contracts in order that the action taken by the department on the many cases to be reviewed would be uniform and equitable. As the result of these investigations, it was found that but few of the contractors maintained records sufficiently complete to show definitely the effect of the war on the cost of executing their contracts, and it has therefore been difficult to make satisfactory adjustment in many of the cases. Practically all of the contracts subject to adjustment have been acted upon and it is found that the average increase granted amounts to 31 per cent of the contract rate. It has been necessary to order reinvestigations in a number of instances and this has delayed action on a few of the 11 outstanding cases.

PNEUMATIC TUBES.

The act of July 13, 1892, making appropriations for the service of the Post Office Department, authorized the Postmaster General "to examine into the subject of a more rapid dispatch of mail matter between large cities and post-office stations, and transportation terminals located in large cities by means of pneumatic tubes or other systems."

Acting under this authority the Postmaster General, under date of July 26, 1892, issued an advertisement inviting interested parties to submit descriptions of pneumatic tubes "and an offer to submit test." The first pneumatic tube for the transmission of mail was used in Philadelphia in 1893 in an experimental way.

March 1, 1894, the service was formally recognized and paid for by the Post Office Department. Investigation shows that pneumatic tubes had not been a success for commercial purposes. A line of 10-inch tubes about $4\frac{3}{4}$ miles long was laid in Boston for commercial uses, but was not a success, and was subsequently leased to the Post Office Department on November 1, 1906, for the transmission of mail, at a rental of \$17,000 per mile per annum, for a period of 10 years.

From 1897 to 1918, excepting 1902, when Congress declined to appropriate for this service, a total of \$11,752,567.16 had been expended for the use of pneumatic tubes.

After an exhaustive investigation, during which there was adduced the testimony not only of postal experts of years' experience but that of many others sincerely interested in the betterment of the service, the Postmaster General recommended the discontinuance of pneumatic-tube service. That system of transporting mails was beyond question extremely costly and at the same time very inferior to the more modern methods of transporting mail. Congress failed to appropriate funds for the maintenance of pneumatic tubes during the fiscal year beginning July 1, 1918, and their use as a means of mail transmission was finally dispensed with at midnight on June 30, 1918.

It is estimated that the mail formerly transmitted through pneumatic tubes, at an annual expense approximating \$1,000,000, is now carried more expeditiously in Government-owned motor trucks at an expense of less than \$400,000 a year.

TUNNEL OR UNDERGROUND ELECTRIC RAILWAY FOR THE TRANSMISSION OF MAIL IN NEW YORK.

In the last annual report of the Postmaster General reference was made to the desirability of securing means by which mail of all classes within the congested district of New York City might be carried underground without the necessity of breaking packages.

In February, 1911, a committee appointed by the Postmaster General of Great Britain to consider the question of the transmission of mails in London, after an exhaustive investigation of the practicability of the pneumatic tubes as then operated in six of the largest cities of the United States, discarded the American system of pneumatic tubes from their consideration because of the restricted capacity of the containers used and its inability to carry all of the first-class mail and recommended an underground electric railway system as the only practicable method of transit that would adequately meet the requirements of London. I am informed that a tunnel for this purpose was under course of construction in London at the time war was declared, but its completion has been delayed.

As conditions in New York were analogous to some extent to those in London, the Post Office Department under date of October 24, 1912, appointed a committee to investigate and report on the advisability of the establishment of mail service between the Grand Central and the Pennsylvania terminals in New York, N. Y., either by a pneumatic or an electric tube system. Under date of February 1, 1913, this committee recommended to the Postmaster General that steps be taken looking to the establishment of service by tunnel or tube operating carriers not less than 24 inches in diameter between the points named.

Because of the establishment of the parcel post in January, 1913, it at once became apparent that a container 24 inches in diameter

would not provide for the transportation of all classes of mail and investigation was continued into the feasibility of an underground system having sufficient capacity to carry all mail of all classes between the three principal mailing points in New York.

Under date of April 12, 1918, an exhaustive report was submitted by engineers wherein they outlined a plan of underground transportation in New York, by subways, that appears to be entirely practicable and can be constructed at a reasonable cost. This plan contemplates the building of a subway between the Grand Central Station and the main post office at Pennsylvania Railroad Station, between which points the largest tonnage of mail is transported and where the principal connections are made between the northern and southern sections of that city; also a connecting line to City Hall Station, formerly the general post office.

A subway connecting the Grand Central Station with the Pennsylvania Terminal post office, which it is recommended be first constructed, will cost for construction approximately \$1,125,000, and for equipment \$353,000, making a total cost of \$1,478,000, according to the estimate of the engineers, and will result in a very material saving in yearly operation over the present cost of vehicular service. As the most congested streets in the city are crossed in performing surface transportation between these two points, it would appear that the route suggested would afford an ideal test of both the practicability and economy of the underground system. Should this service prove practicable and economical, it should be extended to City Hall Station at Broadway and Park Row, thereby giving to New York a system of underground mail transportation superior to that operated in any other city in the world.

A comprehensive system should also be worked out for similar transportation in other cities where the quantity of mail and the congestion of traffic justify it.

The Secretary of War has been requested to detail one or more engineers of the Army to make a thorough study of the subject and the results of this study will be submitted to the Congress as soon as completed and reported.

It is urgently requested that an appropriation of \$1,500,000 to be paid from the surplus postal revenues of the fiscal year 1919 be made by the Congress so as to enable the department to commence without delay the construction of a tunnel between the Grand Central Station and the Pennsylvania terminal post office.

PHYSICAL VALUATION OF PUBLIC BUILDINGS USED FOR POSTAL PURPOSES.

During the fiscal year ended June 30, 1914, for the first time in the history of the Postal Service, the Post Office Department had an inventory made of the Federal buildings used in whole or in part for

postal purposes and found that the total present value of the buildings, sites, and equipment chargeable to the Postal Service amounted to \$115,266,213.91, and that the rental value of the property used by the Postal Service was \$6,402,257.44 annually.

It has frequently been stated during recent years that had the department paid rent for the space it occupies in Government-owned buildings there would have been no surplus postal revenues. This statement is erroneous. The department could have paid rental for such space at the rates prevailing in the various cities and still have had a surplus some years of several millions of dollars, notwithstanding the fact that no credit was allowed for the transportation and handling of franked and free matter. If postage at the prescribed rates had been paid on such matter, the Postal Service would have received revenue amounting to more than three times as much as the rental for the space utilized in Government-owned buildings.

SELECTION OF SITES FOR GOVERNMENT BUILDINGS.

The Postmaster General in his annual report for the fiscal year ended June 30, 1913, recommended that all sites for Federal buildings to be used exclusively for post-office purposes be selected by the Post Office Department. While Congress failed to act favorably on the proposed legislation, the object to be attained was partially accomplished by an agreement between the Treasury and the Post Office Department, whereby the Secretary of the Treasury refers to the Postmaster General for review and recommendation all cases involving the selection of sites for post-office buildings. This action enables the Post Office Department to have one of its representatives make an inspection of the different locations offered and submit a report regarding their relative desirability from a postal service viewpoint.

Inasmuch as the location of a post office has a very material bearing on the cost of the city delivery service and mail transportation, it is highly important that the Post Office Department should have the right to select sites for post-office buildings. Under existing law authority to select Federal building sites for postal purposes is vested in the Secretary of the Treasury.

FEDERAL BUILDINGS.

The act of March 4, 1913, created a Public Buildings Commission, composed of the Secretary of the Treasury, the Postmaster General, the Attorney General, and four Members of Congress. The commission was instructed to "present to Congress a connected scheme, involving annual appropriations for the construction and completion of public buildings heretofore authorized within a reasonable time, and * * * frame a standard or standards by which the size of

the public buildings shall, as far as practicable, be determined, and * * * report as to the adaptability in size, accommodations, and cost of buildings hitherto authorized to the communities in which they are to be located; and also whether the existing appropriations shall be increased or diminished to meet such requirements." On April 30, 1914, the commission presented to Congress a report signed by a majority of the four members, dissented to in minor details by one other member, and accompanied by a letter from the Attorney General stating that he had been unable to study the subject sufficiently to enable him to arrive at a fixed conclusion. The Postmaster General after an exhaustive investigation, dissented fundamentally from the views of the majority and submitted a minority report, presenting clearly and in detail the reforms he advocated in the then existing method of authorizing and constructing Federal buildings. The report of this commission was printed as a public document (H. Doc. No. 936, 63d Cong., 2d sess.), and special attention is invited to the minority report, hereinbefore mentioned on page 15 thereof.

While neither of the reports have been acted upon by Congress, there has been no public buildings legislation since the act of March 4, 1913, and therefore the failure of Congress to prescribe a public building policy has been of no consequence.

The proper policy with regard to the construction of public buildings would seem to be one under which buildings would be authorized primarily for economic reasons and constructed principally for utilitarian purposes. It is a waste of public funds to erect buildings of a monumental type and it would, therefore, seem advisable to construct buildings of the factory type, where a maximum space with adequate light and ventilation can be secured at a minimum cost. The effect of such a policy would be to subserve the material interest of the Government and to make possible orderly procedure under a logical program. The minority report accompanying the report of the Public Buildings Commission sets forth the need for clearly defined policies with respect to authorizations and construction of public buildings and proposes standards for the guidance of Congress in authorizing public buildings and for determining the size and limit of cost of each building.

It is the view of the Post Office Department that a public building for post office purposes only is not warranted unless the rental paid for Government offices is as much as \$1,000 per annum, and then only when either the gross post-office receipts amount to as much as \$15,000 or the population is as much as 5,000.

This report was officially indorsed by a former Supervising Architect of the Treasury Department and also by the American Institute of Architects in letters addressed to the Postmaster General under

dates of May 16 and November 11, 1914, respectively. The feasibility of standard plans for reducing the amount of technical services required and for expediting the work of construction is established by means of tabular statements. These standards were applied to all pending authorizations, and it is shown by comparison that had Congress been able to avail itself of such standards in framing the act of March 4, 1913, the appropriation of \$41,797,350 might have been curtailed by more than \$15,000,000 without sacrificing any substantial benefits to the Postal Service or to the people in the communities affected.

Under existing law plans for public buildings to be occupied in whole or in part by the Postal Service require the approval of the Postmaster General and this approval is not given until after the plans have been carefully reviewed by a board of Postal Service experts designated for the particular service. In reviewing the plans for buildings authorized by the act of March 4, 1913, and also by previous acts, this board made practicable application of the views expressed by the Postmaster General in connection with the type of building that should be provided for post offices with the result that a material saving was effected in the cost of construction, and better lighted and better ventilated buildings were secured for Postal Service.

GOVERNMENT BUILDINGS AND POST-OFFICE QUARTERS.

In October, 1918, a list of offices occupying Government buildings, where insufficient workroom space was available to permit the postal business to be transacted in an expeditious and economical manner, was submitted to the Committee on Public Buildings and Grounds, House of Representatives. However, there has been no public-building legislation since the act of March 4, 1913, and building operations on the projects authorized by that act were curtailed during the period of the war. The parcel post was established only two months prior to the enactment of the last public-buildings bill, and it is that branch of the service that has had such a remarkable growth and for the handling of which provision must be made immediately. The suspension of construction work on authorized projects, the failure to provide for additional extensions, and the inauguration of the parcel post have brought about a serious situation with respect to space, both in Government-owned post-office buildings and in quarters rented by the department.

The space situation is particularly acute in the larger cities, where the increase in the volume of mail handled is far in advance of the normal increase for the entire country. Practically every postal station of the New York office occupying quarters leased prior to January 1, 1916, is in urgent need of additional space and in some

cases it is only with the greatest difficulty that business is being transacted in the accommodations available. This is especially true in the case of Foreign Branch Station, where the lease on the quarters will expire October 8, 1920. The greater portion of the foreign mail of the entire country passes through this station and although the matter of securing larger quarters has been under investigation by representatives of the department since January 1, 1918, it has been impossible to obtain a proposal to provide the required amount of floor space. The inspectors who have been conducting the investigation report that not less than 130,000 square feet of floor space should be obtained for this station and that if a 20-year lease is made the rental will be approximately 25 per cent less per annum than in the event a lease is made for a period of only 10 years, which is the maximum time for which a lease can be made under existing law.

The quarters occupied by Hudson Terminal, City Hall (formerly the main post office) and Wall Street Stations, and Station P (located in the Customs House) contain only 226,500 square feet of floor space, and are wholly inadequate to the needs of the service. To properly accommodate the business of these four stations, 400,000 square feet of floor space should be available.

The entire space available for the transaction of postal business in the Federal building at Chicago provides less than 400,000 square feet of floor space, and a large part of this space has been secured at a sacrifice of natural light, as it has been necessary in order to increase available space to floor over many light wells. A new building containing approximately 1,200,000 square feet of floor space should be authorized for Chicago, as it is believed that the different branches of the postal service will require that amount of floor space prior to the year 1935. Even with the additional space that will be provided by the suggested new building, it is contemplated to retain space in the present building for the administrative offices.

The workroom of the quarters occupied by the main post office at Philadelphia contains 41,000 square feet of floor space, while not less than 100,000 square feet are required to meet existing needs of the service. If a new building is erected, not less than 200,000 square feet of workroom space should be made available.

The workroom of the quarters occupied by the main post office at Boston contains 19,500 square feet of floor space, while not less than 65,000 square feet are required to meet existing needs of the service. If a new building is erected, not less than 90,000 square feet of workroom space should be made available.

The quarters occupied by the post office at Detroit have been inadequate for several years and at this time not less than 100,000 square feet of floor space should be available for workroom purposes. The workroom of the quarters now occupied contains less than

35,000 square feet of floor space. So urgent is the need for additional workroom facilities in this city that the Post Office Department recently requested the Secretary of the Treasury to secure outside space for the Internal Revenue Bureau, in order that the rooms now occupied by that branch of the service may be surrendered to the Postal Service.

Even should Federal buildings be authorized at the next session of Congress to relieve the congestion at New York, Chicago, Philadelphia, Boston, Detroit, and other cities, in view of the time that will elapse before the structures can be occupied, it will be necessary to secure additional space under lease for some years to come. Existing law authorized the Postmaster General to enter into leases for post office quarters for a period not exceeding 10 years. In the larger cities, it is practically impossible to secure adequate space properly arranged in buildings already erected, but it is usually possible to find suitable locations and to arrange with the owners to erect temporary buildings thereon and lease them to the Postal Service.

In such cases, the owners fix the rental at a figure that will not only reimburse them for the expense incurred in erecting and equipping the building but also to pay all taxes and other charges levied against the property, which in most instances is being held awaiting a material advance in real estate values or with the object of erecting a large permanent building for private business purposes at the expiration of the department's lease. It is an established fact that where the department makes a lease for post office quarters, the lessor prorates the cost of equipment over the term of the contract and the equipment is paid for as rental, title remaining in the lessor at the expiration of the lease. It is further true that where a temporary building is erected, the cost is also prorated over the term of the lease. Thus the Government pays for both the building and equipment during the period of occupancy, but at the termination of the lease the title to both remains vested in the lessor.

In the light of these facts it is highly important that greater latitude be permitted in the leasing of buildings for post office purposes, with special reference to the period of occupancy. It is believed that authority should be granted to enter into leases in the larger cities for a term not exceeding 20 years. This would enable lessors to prorate the cost of equipment and temporary structures over a period of 20 years, thereby enabling them to submit much more reasonable offers and at the same time insure to the department a longer period of tenancy.

In renewing leases for post office quarters or in leasing new quarters the increase in rental varies from 25 to 100 per cent, and in some instances even more, over the amount paid under expiring con-

tracts. With a view to relieving the present congestion and for the purpose of providing space to meet the needs of the service in the near future, investigations for new or enlarged quarters are pending in many of the larger cities. Furthermore, there are approximately 4,600 post offices assigned to the lower grades of the third class occupying quarters on a monthly rental basis and the owners thereof make frequent demands for additional rental for the use of their property. These increases in the aggregate result in a heavy charge against the appropriation for rent, light, and fuel.

Another matter of pressing importance at this time is the inadequacy of the maximum allowances that may be granted for rent and for light and fuel for post offices of the third class. The act of May 27, 1908, ch. 206; 35 stat., 410, provides that—

There shall not be granted for the use of any third-class post office for rent a sum in excess of \$500, nor more than \$100 for light and fuel, in any one year.

Due to the unusual conditions resulting from the war the department has had the greatest difficulty in obtaining quarters and equipment of any description for the larger offices of the third class, within the maximum rental authorized by law, and the cost of fuel and light at such offices in almost every instance exceeds the maximum authorized expenditure for those items. It is recommended that when the next Postal Service appropriation bill is enacted the maximum for rent and for light and fuel for post offices of the third class be increased to \$720 and \$180 a year, respectively, as it is believed that within these amounts satisfactory accommodations, including heat and light, can be obtained for post offices of the class in question.

The standard form of lease used by the Post Office Department contains a clause authorizing the Postmaster General, in his discretion, to cancel the contracts upon three months' notice and, while this provision is exercised only in those cases where quarters become inadequate and the lessor is unable to furnish, or declines to furnish, additional space upon reasonable terms, it is nevertheless a matter of frequent objection on the part of prospective bidders, and in almost every instance a higher rate of rental is charged than would be the case were the cancellation provision omitted from the lease. While this feature of the lease is an administrative matter, it is believed that it should be modified and, if authority is granted, to enter into leases for a period not exceeding 20 years it is the intention to have the cancellation provision recite that the lease will not be terminated until 25 per cent of the period has elapsed, and then only by giving the lessor one year's advance notice.

POSTAL ORGANIZATIONS.

In my 1917 report I recommended the repeal of the act of August 24, 1912, which is construed to permit the affiliation of postal em-

ployees with labor organizations which sanction recourse to the strike or boycott to enforce their demands.

I most earnestly renew this recommendation and again call the attention of Congress to the impropriety of Government employees owing allegiance to any organization which might stand between them and the Government, and to the actual menace to governmental authority which is involved in such affiliation.

The avowed purpose of labor organizations is not alone to advance the social and economic welfare of members of their order but to exercise a coercive influence upon the employer to compel submission to their demands. It is for the purpose of coercion that strikes and boycotts are resorted to. The strike and the boycott are weapons designed to be used in attack or in resistance. The Government of the United States is not to be attacked or resisted by any citizen of the land. Surely no such special privilege is reserved to those who, through the nature of their employment, are sworn to serve the Government itself and owe to it the special allegiance of service duty.

It can be only upon the assumption that the Government is unjust, tyrannical, and compliant to force alone that the contention can be sustained that Government employees require the support of an outside organization to compel the Government to respect their rights and do them justice.

Organizations which sanction strike and boycott serve the private interests of the members of the order. The labor organizations are formed as a defense against employers. When the employer is the Government of the United States such an association of its employees is aimed at the Government and is inconsistent with the performance of public service.

Whatever interest labor may claim in the products of its toil, it can not be claimed for Government employees that they acquire a larger interest or greater power in the Government than that of other citizens, because of the character of their employment. They have no right to make an excuse of their public employment for dictating public policy or interfering with the orderly processes of Government. There is one federation—"One Big Union"—formed to promote the welfare of its members, to which they in common with all other American citizens owe allegiance. All organizations within the jurisdiction of this union must be subordinate to it and obligated to support it—the Government. No organization of class or creed can be invoked to coerce the Government without taking on a taint of disloyalty.

The obligation of the Government and of all its representatives, officials, and employees is to guard and promote the public welfare. An organization sanctioning the strike and boycott for the enforce-

ment of its demands is devoted solely to personal and selfish interest. It is manifestly improper that employees of the Government should affiliate themselves with such an organization.

Government employees should be permitted to organize for their social and general welfare, to appear before committees of Congress, and to furnish information concerning the postal service of which they may have knowledge. They should not, however, be permitted to form organizations or to affiliate with an organization designed to interfere with the discipline and administration of the service, to influence the election of persons nominated for public office or to dictate legislation in their own interest and not for the public welfare.

Labor organizations undertake to compel employers to comply with their demands. They regard solely their own economic welfare and not that of the general public, which, on the contrary, they utterly disregard when they employ the strike and boycott under conditions which often bring suffering upon the entire public. Associated in full membership with some of these organizations are certain individuals who openly defy the Government and assail all government, preaching the doctrine of disorder and violence.

No man is qualified for public service who does not realize that his first duty is to the public. The orderly processes of government and the administration of public affairs can not be efficient and effective when duty to the public is not put first.

As I have before urged upon Congress, the affiliation of Government employees with an outside organization which resorts to strike as a means of adjusting grievances is a menace to the welfare of the Republic, resulting in a divided allegiance, that to the organization being more personal and selfish and stronger than that to the Government. This applies to all Government employees, whether State, municipal, or Federal. Such affiliation engenders dissatisfaction, discontent and unrest, and such a resistance to constituted authority as to ultimately result in lowering the efficiency of the public service.

The enforcement of the principle that Government employees should not hold an affiliation incompatible with their obligation to the public service can not be distorted into a reflection upon the efficiency and loyalty of the postal employees, whose devotion to public duty under the trying test of war was conspicuously demonstrated. But the principle is one which can not be prudently disregarded.

Since my report to Congress on this subject, events have still more strongly demonstrated the soundness of the position I then took. The activities of "organizers" in a campaign to draw employees of the Federal Government and of municipalities into affiliation with the American Federation of Labor have made more manifest the danger which attends a failure to recognize that there can be but one allegiance in the Government service.

With the assumption of Government control of the wire systems of the United States a new group of employees, holding a different status from those of the Postal Service, came within the jurisdiction of the department. While the temporary character of the authority over this group did not warrant interference with or objection to their affiliation with any organization they might choose, the Postmaster General announced and enforced the principle that "a strike on their part is not permissible" while in the Government service. No discrimination was permitted, however, between union and non-union employees, and those who resorted or threatened to resort to a strike were required to resume or to continue their employment before the department would treat with them. The report of the Wire Control Board will disclose that this principle was strictly maintained and that the wires were returned to their owners with no strike pending.

In 1895 organizations of postal employees had become so active in attempts to influence legislative and administrative action that Postmaster General William L. Wilson found it necessary to issue an order directing that no postal employee, under penalty of dismissal, should visit Washington for the purpose of influencing legislation before Congress. This order having afforded but temporary relief President Roosevelt on January 21, 1902, issued an Executive order forbidding all officers and employees of the United States to either directly or indirectly, individually, or through associations, solicit an increase in pay, or to influence, or to attempt to influence, in their own interest any other legislation whatever, either before Congress or its committees. The penalty for the violation of this order was dismissal. This afforded relief, but as a result of terrific pressure, the Congress on August 24, 1912, by a rider on an appropriation bill, permitting Government employees to form organizations, in effect nullified this Executive order issued by President Roosevelt. As a result of this legislation many organizations now maintain representatives in Washington for the purpose of influencing legislation and presenting grievances. By distorting and misrepresenting facts, they have encouraged disrespect for administrative officers, disloyalty to the service, and rendered the maintenance of discipline extremely difficult. An attitude of hostility has been assumed by them for years, irrespective of how or by whom the service has been administered. In calling the attention of Congress to this matter in my report of 1917, I cited the fact that civil-service employees are selected through competitive examination without regard to politics or religious faith, their appointment and promotion being determined by the merit system, and expressed the belief that these employees should have imposed upon them certain limitations as to their activities.

The Postmaster General again repeats that the conduct of these organizations at this time is incompatible with the principles of civil service and with good administration of the Postal Service. They are fast becoming a menace to public welfare and should no longer be tolerated or condoned.

At no time have employees of the Postal Service been denied the privilege of presenting for themselves any complaints or grievances which they might believe demanded consideration. On the contrary, they have been invited to make known their views or any suggestion for the betterment of their condition and the improvement of the service, and have been repeatedly given assurance of fair and just treatment.

The question involved is whether the orderly processes of Government shall be ignored, whether labor organizations can defy its authority and put into effect their will regardless of the rights of others and of the public interest. The Government undertakes to see that even-handed justice is meted out to all. To yield to outside agencies in the exercise of governmental authority to decide what action shall be taken is to confess that the Government has failed and can not be relied upon to do what is right. Such a confession would be indefensible.

The progress of events during the past two years have but served to emphasize that the arguments advanced in 1917 in regard to these organizations were sound, and the position of the department then was well founded as it is now. Accordingly attention is again directed to this subject, and the recommendation in the annual report for the fiscal year 1917 for the repeal of the provision in the act of August 24, 1912, is earnestly renewed.

APPOINTMENT OF POSTMASTERS.

The success of measures devised for the improvement of the service depends very largely on the loyalty and efficiency of the postmasters. The appointment of these officers has been regarded, therefore, as of paramount importance. At the outset of the administration the Postmaster General laid down the requirement that all incumbents and appointees must devote their time and personal attention to their official duties. This requirement has been strictly adhered to and great care taken to examine into the qualifications of all persons proposed for nomination by the President.

The magnitude and multiplicity of the business operations of the postal establishment and the perfect service which the people expect and to which they are entitled, require that not only the greatest care be exercised in the selection of postmasters but that their tenure of office shall depend entirely upon efficient and meritorious service. Such efficient service can best be rendered by men of executive

ability, training, and experience. This makes it essential that persons selected for important positions be chosen because of their fitness and retained only when they render satisfactory service to enable the department to obtain the benefit of such a policy. The Postmaster General has heretofore earnestly recommended that the necessary legislation be enacted to include in the classified service the position of postmaster at Presidential offices. The civil-service rules would then be applicable to the appointment and retention of these postmasters. A provision in law in line with this recommendation passed one branch of the Congress but failed of passage by the other branch.

To afford some relief, the President on March 31, 1917, issued an Executive order requiring that when a vacancy occurs in the position of postmaster of any office of the first, second, or third class as the result of death, resignation, removal, or when on the recommendation of the Postmaster General that the efficiency or needs of the service requires that a change shall be made, the Civil Service Commission shall hold an open competitive examination to test the fitness of applicants to fill such vacancy; and when such examination has been held and the papers in connection therewith rated the commission shall certify the result to the Postmaster General, who shall submit to the President the name of the highest qualified eligible for appointment to fill such vacancy, unless it is established that the character or residence of such applicant disqualifies him for such appointment. It is also provided in said Executive order that no person who has passed his sixty-fifth birthday shall be given the examination therein provided.

The number of appointments of postmasters at presidential offices during the past six years is as follows: 1913, 1,528; 1914, 3,720; 1915, 2,630; 1916, 2,693; 1917, 1,753; and 1918, 2,079.

Under the Executive order referred to during the past fiscal year 3,008 appointments and reappointments were made at offices of the presidential grade. Examinations for these offices are divided into two groups, those at offices where the compensation is from \$1,000 to \$2,400 per annum, and those where it is in excess of \$2,400 per annum. For appointment at offices in the first group candidates are examined on arithmetic and accounts, penmanship, letter writing, and business training and experience. At offices where the compensation is in excess of \$2,400 per annum, personal investigation is made of each candidate by representatives of the Civil Service Commission, one of whom is selected by the commission from the Post Office Department, and these representatives make report of their investigation direct to the commission. In all cases acted upon during the year the first eligible was appointed except where it was clearly shown that this eligible was disqualified under the terms of

the Executive order. Since the issuance of the order a total of 7,483 nominations has been submitted; 6,195 of these or 82.78 per cent have been reappointments. In 1,188 cases not reappointments the first eligible was appointed and in 79 cases only was other than the first eligible selected, and in these cases the failure to appoint the highest eligible was due to his death or refusal to accept the office; or the condition of his health, such as tuberculosis, skin disease, or other physical defects; or because he was disqualified on the ground of character or residence.

This order is the most progressive step toward increased efficiency and businesslike administration in the Postal Service, and although it affords much relief it does not meet the situation fully. It requires that the persons selected for appointment be chosen by open competitive examination and investigation by the Civil Service Commission, but does not affect in any way the tenure of office, and the reappointment of postmasters at the expiration of their terms is still necessary under the law. The provisions of the order have been followed strictly and the wisdom and procedure thereunder have been amply demonstrated in the cases which have been before the department.

However, the department has gone as far as possible in placing these appointments on the merit basis, and it now remains for the Congress to enact legislation extending the civil-service law to include the position of postmaster at offices of the presidential classes, and the previous recommendations of the Postmaster General to that effect are earnestly renewed.

Fourth-class offices are included in the classified civil service and new appointments to these offices are made either from eligible registers furnished by the Civil Service Commission after examination or, in the smaller offices, upon recommendation of post office inspectors. The highest eligible has always been selected for appointment unless it appeared from the records that the appointment of such eligible would not be in the interest of the service. There were 7,083 appointments of this class during the year.

The Executive order of November 30, 1908, extended the scope of the civil service law to all fourth-class postmasterships in the States north of the Ohio and east of the Mississippi, and accorded classified civil-service status to the incumbents of those positions. The same action was taken, by the Executive order of October 15, 1912, with respect to all other fourth-class postmasterships, excepting only those in Alaska, Guam, Hawaii, Porto Rico, and Samoa. In this manner a large number of persons were classified as postmasters at offices of the fourth class, without having been required to submit to any test whatever of capacity or fitness for the positions held by

them. Accordingly, on May 7, 1913, an Executive order was issued, reading in part as follows:

No person occupying the position of postmaster of the fourth-class shall be given a competitive classified status under the provisions of said orders unless he has been appointed as a result of open competitive examination, or under the regulations of November 25, 1912, or of January 20, 1909, or until he is so appointed.

It was found that approximately 5,000 fourth-class postmasters had been appointed to vacancies as a result of open competitive examinations under the civil-service regulations referred to, and at no time has question been raised as to the classified status of these persons.

All other postmasters of the fourth class have been required to submit to tests of their capacity and fitness in open competitive examinations conducted under the authority of the Civil Service Commission and in accordance with the President's order of May 7, 1913. This work which was undertaken in 1913 was continued and completed in the fiscal year 1916. Postmasters of the fourth class now in office have been appointed under procedure in strict accordance with the spirit and letter of the civil service law.

In accordance with the usual practice of the Civil Service Commission, the department has been furnished, for these appointments, with the names of the three eligibles standing highest on the list. The appointing officer has the right, without question, to select any one of the three eligibles certified. In accordance with the purpose of the President when he issued the Executive order of May 7, 1913, the Postmaster General decided, in the interest of efficiency and the promotion of genuine civil-service principles, to give preference to the eligibles in the order of their civil service ratings. To this end the following instructions were issued by him:

In selecting persons from the eligible registers furnished by the Civil Service Commission for appointment as postmasters of the fourth class, it is my desire that the persons with the highest rating be chosen, unless good and valid reasons are submitted to the department showing that this would not be in the best interest of the service. If reasons are submitted sufficient to make the selection of the first eligible inadvisable, then it is my desire that the person with the next highest rating be chosen, unless good and valid reasons are submitted to show the inadvisability of his appointment. In such case the third eligible may be selected. In no case should the second or third eligible be chosen unless the appointment of one of the highest standing eligibles has been shown to be inadvisable from the standpoint of the greatest efficiency in the Postal Service. In reaching conclusions as to the most desirable appointments an endeavor should be made to select persons whose business and temperamental equipment is likely to reflect credit on the Postal Service.

These instructions have been scrupulously adhered to.

Of the postmasters classified by Executive order of October 15, 1912, 66 per cent were retained as the result of the civil-service test

imposed on them. The places of the 34 per cent remaining have been given candidates who have demonstrated their superior fitness and capacity, 30.4 per cent were given to the first eligibles, 2.7 per cent to the second eligibles, and 0.9 per cent to the third eligibles.

The work of appointment and classifying all postmasters of the fourth class under the order of May 7, 1913, is now completed and it may be said that no such appointment has been made except after a test, under civil-service procedure, of the qualifications and efficiency of all applicants for the position.

Consistently with the practice of appointing postmasters of the fourth class with an eye solely to the efficiency of the service, as well as with the recommendation that postmasters at the larger post offices be appointed under civil-service procedure, classified postmasters at post offices advanced from the fourth class to the presidential grade have been retained in office, provided their services have been satisfactory to the department and to the patrons.

SALARIES OF POSTMASTERS.

The act approved March 3, 1883, as subsequently amended, provided that the salaries of postmasters of the first, second, and third classes should be readjusted annually, effective at the beginning of the fiscal year, on the basis of the gross receipts for the calendar year preceding. Effective November 2, 1917, as a war revenue measure Congress established a 3-cent rate on letter mail and a 2-cent rate on postal and post cards, concomitant with which it was stipulated that from July 1, 1917, there should be no increase during the war in the salaries of postmasters at offices of the first, second, and third classes. The administration of this law no doubt imposed hardship upon some postmasters, particularly those of third-class offices, whose salaries range from \$1,000 to \$1,900 per annum.

During this period of stationary salaries the cost of living not only increased but the working forces were depleted through the military draft and more attractive remuneration offered in other lines of employment. Competent clerical assistance was difficult to obtain in some localities and when obtained was at greatly increased cost. Coupled with these handicaps the labors of postmasters were largely increased by the many additional duties imposed upon them, including the sale of war savings, thrift, and revenue stamps, registration of alien enemies, recruiting for the Army and Navy, Liberty loan publicity, Red Cross work, and other war activities. Notwithstanding these conditions the loyalty and faithfulness of postmasters remained unshaken, but few complaints were received, and all evinced an unusual spirit of sacrifice and cooperation.

As the former postal rates were restored and the restrictions in regard to salary increases removed, effective July 1, 1919, it was than

within the power of the department on that date to increase the salaries of many postmasters. The total annual increase amounted to \$1,050,900, of which \$284,400 went to first-class offices, \$661,000 to second class, and \$105,500 to third class.

SALARY AND STATUS OF EMPLOYEES IN POST OFFICES.

The average salary of clerks increased from \$1,052.97 in 1913 to \$1,318.03 in 1919, and city carriers from \$1,087.57 to \$1,305.02.

For the fiscal year 1913 the percentage promotions were first provided for, 75 per cent from \$1,100 to \$1,200 in first-class post offices and 75 per cent from \$1,000 to \$1,100 in second-class offices.

For the fiscal year 1914 the first grade of clerks and carriers was abolished, appointments after June 30, 1913, being made at the second grade, \$800.

For the fiscal year 1917 the following percentage promotions were provided: Clerks, at first-class offices, 75 per cent from \$1,100 to \$1,200, 5 per cent from \$1,200 to special clerks at \$1,300, and 5 per cent of the special clerks at \$1,300 to special clerks at \$1,400; and at second-class offices, 75 per cent from \$1,000 to \$1,100 and 5 per cent from \$1,100 to \$1,200.

For the fiscal year 1918 percentage promotions were provided as for the year 1917, with the exception that the percentages were 85 and 15 instead of 75 and 5.

The act of March 3, 1917, provided increased compensation at the rate of 10 per cent effective during the fiscal year 1918 for classified employees appointed after that date at salaries of \$800, \$900, and \$1,000. On July 1, 1918, every postal clerk and city letter carrier received a \$200 increase in their compensation and on July 1, 1919, every such employee, whose services were satisfactory after a year's service in the former grade, was promoted an additional \$100 effective July 1, 1919. Increased compensation was also provided other employees at the rate of 15 per cent to those who received a salary of from \$900 to \$1,500, 10 per cent to those who received a salary of from \$1,500 to \$2,200, and 5 per cent to those who received a salary above \$2,200. The Comptroller of the Treasury ruled that the minimum salary of a supervisory employee at first-class offices, as well as that of the assistant postmaster of a first-class office, was \$1,800, and also that the minimum compensation of an assistant postmaster at a second-class office was \$200 more than the highest grade clerk or city carrier connected with that office. This has resulted in a great number of promotions in the supervisory employees' compensation as well as that of assistant postmasters.

At the present time legislation is pending giving a further bonus to employees in the Postal Service covering the current fiscal year as follows: Clerks and city carriers in the \$1,000 grade, \$240; those in

the \$1,100 and \$1,200 grades, \$200; those in the \$1,300, \$1,400, \$1,500 and \$1,600, \$150; those receiving a compensation of \$1,700, but not more than \$2,500, \$100; printers, mechanics, and skilled laborers who receive a compensation of \$1,150 to be increased \$150, \$1,265, to be increased \$135, \$1,380, to be increased \$70; watchmen, messengers, and laborers who receive a compensation of \$1,035 to be increased \$205. Provision is also made for the employment of substitutes at the rate of 60 cents an hour instead of 40 cents as at present. The above bonuses, however, will not apply to employees who have received \$300 or more increased compensation during the current fiscal year.

If this increase should be granted by the Congress, the opinion is here expressed that the department will at once be placed on a deficiency basis, unless there should be an unlooked for increase in the postal revenues. These proposed increases absorb for the benefit of postal employees the entire increase in revenue for this fiscal year as well as all savings and economies which have been effected within the past seven years and deny to the users of the mails any participation therein. The necessities of the service do not require this and it is manifestly unjust. Requirements for efficient mail service and not expediency should be the sole guide in determining action in a matter of this kind.

PERSONNEL IN OFFICES OF FIRST AND SECOND CLASSES.

During the fiscal year ended June 30, 1919, the appointment of 2,476 additional clerks was authorized for first and second class post offices, and the average salary increased from \$1,157.39 in 1918 to \$1,318.03 in 1919. During the six fiscal years ended June 30, 1916, the average number of resignations and removals of post-office clerks amounted to 4.43 per cent of the entire force; during the fiscal year 1917, which covered the first three months of this country's participation in the war, the separations from the service amounted to 5.45 per cent of the entire force; while during the fiscal year ended June 30, 1918, 12.4 per cent of the force were separated. For the last fiscal year the records show 4,961 clerks resigned and 441 removed, representing 12.08 per cent of the total force, thus showing that the number of resignations is decreasing. In my last annual report attention was called to the fact that during the fiscal year ended June 30, 1918, 3,781 clerks entered the military or naval service of the United States and were granted leaves of absence without pay. The records show that during the past fiscal year, embracing only a little more than the last four months of actual fighting, 1,728 additional clerks were granted indefinite leaves of absence without pay because of entry into the military service. A great many of the military camps have been discontinued and

others greatly reduced, with result that a large proportion of the experienced postal clerks detailed to branch post offices, which had to be established at these camps, have been returned to their home offices. Out of the total number of clerical employees who have been granted indefinite leaves of absence without pay because of entry into the military or naval service, 3,546 have been reassigned to their former positions without loss of grade or rating and, in cases where they returned to duty in time to make it possible to do so, they have been granted their vacations on the same basis as if their services in the post office had been continuous.

The records of the department show that during the fiscal year ended June 30, 1919, 1,206 carriers were granted indefinite leave of absence without pay on account of entry into the military service. The total number of city carriers who have been granted leave of absence without pay on account of entry into military service is 2,903, and out of this total 1,773 have been reassigned to their former positions without loss of grade or rating, and, in cases where they returned to duty in time to make it possible to do so, they have been granted their vacations on the same basis as if their services in the post office had been continuous.

Heretofore, appointments to the position of laborer with a classified status have been made only in 37 of the larger first-class offices where appointments to these positions were made by selection from the skilled laborer register. Under date of January 14, 1919, the department requested the Civil Service Commission to extend the application of the labor regulations to an additional list of 31 offices. The commission concurred in this request and provided that thereafter appointments to the position of laborer in these offices should be made by selection from the skilled laborer register of eligibles who had passed a designated strength test. The department has recently requested the Civil Service Commission to give favorable consideration to the question of extending the application of the labor regulations to all post offices of the first and second classes in order that all appointments to these positions may hereafter be made by the selection of persons having a classified status, except in the case of temporary appointments made in an emergency during the absence of an eligible register.

In order that the granting of vacations with pay might be uniform in the cases of all employees in first and second class post offices and with a view to eliminating the apparent discrimination heretofore existing in this matter in favor of the city carriers as against the clerical employees of the office, Congress upon recommendation of the Department placed in the Post Office appropriation act for the fiscal year 1920 a proviso that hereafter the 15 days annual vacation allowed by law to clerks and other employees in

first and second class post offices should be credited at the rate of one and one quarter days for each month of actual service, doing away with the former requirement that these employees should not be granted any vacation with pay until they have completed a year's service.

With a view to eliminating as far as might be possible excess overtime on the part of clerks in post offices, Congress has provided that hereafter whenever practicable in case of emergency or otherwise a substitute is available the postmaster is prohibited from employing a regular clerk overtime.

No action is taken looking to the reduction of classified employees in post offices of the first and second classes except in accordance with the provisions of section 29, Postal Laws and Regulations, which require that charges specific in character shall be preferred in writing and the employee afforded an opportunity in which to submit his written defense. The papers are then forwarded to the department for review and decision. Final action is not taken until after careful review and analysis of the evidence in connection with which the employee's answer is accorded the most careful consideration.

INCREASED SALARIES OF EMPLOYEES IN POST OFFICES.

For the fiscal year 1919 Congress provided a temporary reclassification of salaries for clerks and city letter carriers, dividing them into six grades, from \$1,000 to \$1,500, inclusive, with provision that they should be promoted successively through the grades until they reached the sixth grade, salary \$1,500, each promotion to be made at the beginning of the quarter following the completion of a year's satisfactory service in the next lower grade. This temporary reclassification has been continued for the fiscal year 1920, thus providing a promotion of \$100 during this fiscal year for all clerks and city carriers in first and second class post offices who have completed a year's satisfactory service in their present grades. Congress also enacted a provision of law which, as construed by the Comptroller of the Treasury, fixes the minimum compensation of the supervisory officials in first-class post offices at \$1,800. Under this law many supervisors' salaries were increased \$400. This legislation also fixed the minimum compensation of assistant postmasters of first-class post offices \$1,800 and the minimum compensation for assistant postmasters of second-class post offices \$200 in excess of that paid the highest grade clerk or city carrier in such office.

The department has long felt the need for a reclassification of the positions and salaries of employees in post offices, more particularly in the supervisory grades in first class offices, and in this connection attention is invited to recommendations contained in the Postmaster

General's annual report for the fiscal years 1914, 1915, and 1916. In section 3 of the act making appropriation for the service of the Post Office Department for the fiscal year ended June 30, 1920, and for other purposes, the Congress has provided for a commission consisting of five members of the Committee on Post Offices and Post Roads of the United States Senate and five members of the same committee of the House of Representatives to investigate the salaries of postmasters and employees of the Postal Service with a view to the reclassification and readjustment of such salaries on an equitable basis. It is the hope of the department that this investigation will be most thorough and that as a result of their labors an equitable adjustment of the salaries of all postal employees will be made. It is recommended that any reclassifications made in the salaries of postal employees of a permanent nature shall be based upon normal conditions. It is especially recommended that all unnecessary designations of supervisory employees be discontinued and that a maximum compensation for supervisory officials and a maximum number of positions in each grade be definitely fixed in accordance with the class of the office, based upon its gross postal receipts. The compensation of the senior supervisory employees in the larger post offices should be such as to secure to the Postal Service the most competent men.

While the department has experienced trouble at a few post offices in securing and retaining competent employees it is believed, after careful inquiry, that the mutations in the service have not been greater than are experienced by private industries employing a similar grade of help. At a few of the industrial centers where the man power is below the requirements of industrial activities a spirit of restlessness and a desire for change pervade the labor market. This has been felt in the postal service as well as in manufacturing and commercial enterprises. The requirement that post office employees pass a civil-service examination and attain a certain percentage in both mental and physical capabilities militates against the department in readily securing young men and adequate and proper force and increased compensation will not entirely overcome this handicap or remove the difficulties in securing this character of help in competition with private concerns that employ men and women without competitive examinations.

SUBSTITUTE AND AUXILIARY EMPLOYEES, COMPENSATORY TIME, 8-IN-10-HOUR LAW, AND OVERTIME.

The act making appropriations for the service of the Post Office Department for the fiscal year 1908, provided that auxiliary clerks and carriers should thereafter be paid at the rate of 30 cents an hour (they had previously been paid at the rate of 25 cents an hour), that

they should be required to work not less than two hours a day, and might serve as substitutes.

The 1914 Post Office appropriation act provided that substitutes employed in place of regular clerks and carriers absent without pay should be paid at the rate of 40 cents an hour, and that substitute clerks and carriers otherwise employed should be paid at the rate of 30 cents an hour.

The 1915 Post Office appropriation act contains the following:

Provided, That after June 30, 1914, the pay of substitute letter carriers employed in the places of regular employees absent from duty with pay and of auxiliary and temporary carriers employed at offices where the City Free Delivery Service is already established or may hereafter be established, and of substitute clerks employed in the places of regular employees absent from duty with pay, and of auxiliary and temporary clerks employed in first and second class post offices, shall be at the rate of 35 cents an hour.

In the Post Office appropriation act for the fiscal year 1917, it is reiterated that substitutes for clerks in first and second class post offices and carriers in the City Delivery Service, absent without pay, shall be paid at the rate of 40 cents an hour, and that substitutes employed in the places of regular clerks and city carriers absent with pay, or on temporary service of any kind, should be paid at the rate of 35 cents an hour.

The Post Office appropriation act for the fiscal year 1919 provides that substitute clerks and city carriers, regardless of the nature of the service performed, shall be paid at the rate of 40 cents an hour for such service.

The following provision is contained in the act approved March 4, 1911:

That hereafter for services required on Sundays of supervisory officers, clerks in first and second class post offices, and city letter carriers, compensatory time off during working days in amount equal to that of the Sunday employment may be allowed under such regulations as the Postmaster General may prescribe; but this provision shall not apply to auxiliary or substitute employees.

Beginning with the fiscal year 1917, special clerks are granted compensatory time for Sunday service in the same manner as regular clerks and carriers.

Beginning with the fiscal year 1917, clerks and carriers shall be granted compensatory time for holiday service on one of the 30 days following.

Beginning with the fiscal year 1918, special clerks are entitled to compensatory time for holiday service in the same manner as regular clerks and carriers.

Beginning with the fiscal year 1918, foremen, watchmen, messengers and laborers are entitled to compensatory time for Sunday and holiday service in the same manner as regular clerks and carriers.

The Post Office appropriation act for the fiscal year 1919 provides that—

Hereafter when any employee is entitled under the law to compensatory time for Sunday or holiday service he may, if he so elects, be paid for overtime in lieu thereof.

In the act approved May 24, 1888, the following provision appears:

That hereafter eight hours shall constitute a day's work for letter carriers in cities or postal districts connected therewith, for which they shall receive the same pay as is now paid for a day's work of a greater number of hours. If any letter carrier is employed a greater number of hours per day than eight, he shall be paid extra for the same in proportion to the salary now fixed by law.

In the act approved June 2, 1900, provision is made that letter carriers shall be required to work as nearly as practicable only 8 hours each day, but in any event not exceeding 48 hours during the 6 working days of the week, and such number of hours on Sunday, not exceeding 8, as may be required, service on Sunday to be counted as full day whether actually employed eight hours or less. If legal holiday occurs on working day, and service is performed on said day, if less than eight hours, it shall be counted as eight hours without regard to the time actually employed.

The act approved August 24, 1912, contains the 8-in-10 hour law, effective from March 4, 1913; provision is made for pro rata pay for all overtime for clerks and carriers; compensatory time to be granted for Sunday work on one of the days of the following week.

The Post Office appropriation act for the fiscal year 1917 extends the 8-in-10 hour law to special clerks.

The Post Office appropriation act for the fiscal year 1919 provides that:

Hereafter when any employee is entitled under the law to compensatory time for Sunday or holiday service he may, if he so elects, be paid for overtime in lieu thereof.

Section 3 of the 1919 appropriation act extends the 8-in-10 hour law to watchmen, messengers, and laborers, with pay for overtime.

From the foregoing legislation it will be seen that during this period of many perplexities increases in salaries and improved working conditions of postal employees have been provided from year to year.

RETIREMENT.

The department has gone on record many times urging Congress to provide some retirement measure for superannuated employees in the Postal Service. To dismiss these employees who have been faithful because they have become inefficient on account of increas-

ing age is very hard, yet to continue them in office to the detriment of the service can not be justified under the law. It is hoped that some legislation of this character will be enacted before the end of the present Congress.

UNUSUAL CONDITIONS AT POST OFFICES.

The act of July 2, 1918, fixed the initial salary of clerks and carriers at \$1,000 per annum and provided for automatic promotions of \$100 per annum up to and including \$1,500, the maximum grade. In different sections of the country, notably the oil and mining regions of the West and Southwest and in Alaska, it is at times impossible to procure clerks and carriers at the regular entrance salary or to retain such employees at the salaries permissible under the law. To meet these unusual conditions the department has recourse to the appropriation for unusual conditions. Several cases in point now exist at a number of towns within the Texas oil belt, notably Ranger, where the cost of living is abnormally high and ordinary laborers are paid at rates ranging from \$6 to \$10 a day. When this office was advanced to the second class, July 1, 1919, it became necessary to employ clerks out of the appropriation for unusual conditions and this course has been followed at several offices in other Texas oil fields. Due to the numerous unusual conditions with which the service has had to deal during recent years, the necessity for expenditures from that appropriation has gradually increased. The amount appropriated for the fiscal year 1919 was \$275,000, and while only \$200,000 was appropriated for the fiscal year 1920, it now appears probable that it will be necessary to request a deficiency before the end of the year.

CLERK HIRE AT THIRD-CLASS OFFICES.

Considerable difficulty was experienced in maintaining adequate clerical assistance at third-class offices, due to the fact that we were operating under a statute passed in 1912 which restricted the maximum clerk hire allowable to those offices on a scale ranging from \$300 for offices of the \$1,000, \$1,100, and \$1,200 grades to \$800 at offices of the \$1,800 and \$1,900 grade. This maximum was in normal times sufficient in almost all cases to secure necessary assistance, but during the war when the supply of labor was so greatly reduced and its cost advanced proportionately it was practically impossible for postmasters of third-class offices to procure competent clerical assistance for the maximum amounts that could be authorized by the department. In numerous cases clerks who were not inducted into the military or naval service resigned to accept more remunerative positions. The resultant impairment of the service at these offices

employing only one or at the most two clerks was relatively far greater than at the larger offices. Many appeals for relief were received and these were responded to as far as possible, but the legal limitation as to the maximum amounts allowable so restricted the department's latitude as to work hardships upon some officers where labor conditions were abnormal.

In accordance with recommendations of the department, this condition was remedied in the appropriation act for the fiscal year 1920, the maximum allowance for each group of offices being increased 50 per cent. the scale ranging from \$450 to \$1,200, according to the size of the office. After conditions shall have become normal the maximum allowance will probably not be necessary in all instances. The department will thus be vested with a greater degree of discretionary power and enabled to authorize such amounts as may be actually necessary to provide sufficient assistance at third-class offices where an unusual amount of clerical work is involved.

GUARANTY FUND IN LIEU OF BONDS.

Postmasters and postal employees are required by law to furnish bonds in sufficient amount to protect the Government against losses due to embezzlements or other derelictions by such postmasters and post-office employees. In some instances the bonds are given by personal sureties, but it is the general practice to procure bonds from commercial bonding companies on the payment of annual premiums. Each bond is in a fixed amount, and as loss in excess of that specified in the bond can not be collected from the surety, the protection to the department is not adequate, and the securing, filing, verifying, and approving of the bonds as well as the examination every two years into their sufficiency and the responsibility of the sureties as required by law, entail a vast amount of administrative expense. There is objection to this system of bonding on account of the excessive premiums collected and the labor and annoyance incident to yearly renewals.

It is believed that authority of law should be granted the Postmaster General for the establishment and maintenance of a guaranty fund by assessments against the salaries of those officers and employees who are now required to furnish bonds. Such a fund would provide reimbursement to the Government for the entire amount of every loss regardless of the amount of the individual bond, and the assessment levied against the salaries of officers and employees would be much less than the premiums now paid. Under this plan the amounts of the bonds required of the several classes of employees and postmasters may be equalized so that each will pay an amount in proportion to the opportunity for embezzlement. It will be entirely safe to do this under the guaranty fund plan for the reason

that the entire amount of the fund will be available for the reimbursement of the Government in the case of every loss.

In the interest of both the Government and the employees previous recommendations for the adoption of a mutual bonding plan are earnestly renewed.

RURAL MAIL SERVICE.

Since 1914 rural mail service has been extended to 5,868,000 patrons who were before that time without adequate mail facilities. This was accomplished at an additional annual expense for the establishment of service of \$500,000, provided for in the 1914 appropriations, which has not since been increased. The appropriations for compensation of employees engaged in the collection and delivery of mail on routes of the entire rural service have increased from \$47,000,000 to \$68,000,000. The number of pieces of mail handled annually has increased from 3,093,350,334 in 1913 to 3,870,068,064 in 1919, or an increase of 776,717,730 pieces. Since 1914 there have been also established 833 routes, known as motor rural routes, of 50 miles or greater in length, where the use of motor vehicle, with reasonable regularity throughout the year, is assured.

On March 4, 1913, over 2,600 petitions for the establishment and extension of rural routes had been pending for several years in the department. Before July 1, 1913, this number had been reduced to 834, and to-day the total number of petitions for establishment or extension of service pending in this department does not exceed 368, and not one of them has been here a period of one year.

In 1913 the cost of Rural Delivery Service per person was \$1.97, and, notwithstanding the increase of \$20,000,000 in compensation to carriers employed in this service, or approximately 50 per cent, the cost per patron had been reduced to \$1.913 in 1918.

The transportation of mail in bulk from general supply stations located on rail or water transportation routes to points in the interior has vastly increased in the last six years, and new methods of operation were necessary to accommodate the great quantity of parcel post matter presented for conveyance. At Vernal, Utah, a bank building was wholly constructed from materials transported by parcel post. Everywhere in the far West great quantities of matter were presented for mailing because the postal means of transportation alone were available in the development of these vast areas. Consequently the department adopted the plan for the carriage of first and second class mail and perishable parcel post at a flat rate per annum on a fast schedule and the conveyance of third-class and ordinary parcel post mail on a slower schedule at pound rates. Through means of advertising for bids under this plan, the department was able to secure reasonable proposals for the service required, and effected a saving of \$500,000 during the fiscal year 1915 for the Government.

During the fiscal year ending June 30, 1919, rural service was extended to approximately 1,492,280 persons who theretofore had been without such mail facilities. This additional service was furnished with 243 less routes than were in operation June 30, 1918. This reduction in number of routes was brought about by continuing the systematic alignment of routes and elimination of unnecessary duplication of travel. On June 30, 1919, there were 29,282,739 persons, or 6,365,813 families, served by rural carriers at a cost of \$66,031,487 as compared with 27,790,459 persons, or 6,041,404 families, on the same date of the previous year, at an expenditure of \$53,166,502. This increased cost of the rural service over the year 1918 was due almost entirely to additional compensation granted rural carriers. The average cost per rural patron was on June 30, 1919, \$2.255, while on June 30, 1918, it was \$1.913, a unit increase of \$0.342. The number of pieces of mail handled was 3,686,991,928 at a unit cost of \$0.018 per piece, an increase of \$0.0047 per piece.

On June 30, 1919, 43,210 routes were in operation covering 1,143,467 miles and averaging 26.46 miles to the route. It is interesting to note that the total number of routes in 1918 were 43,453, aggregating 1,127,110 miles in length and averaging 25.94 miles to the route. A comparison of the figures for the two years will show that there are fewer routes in operation, but the comparison also shows that considerably more mileage is covered even though the average length of routes is only slightly increased over that for the fiscal year 1918. This is the result of the department's effort to standardize the length of rural routes and to make the work of rural carriers more nearly uniform.

It is believed that the department's accomplishments warrants the granting of administrative discretion in the establishment of rural routes from 36 to 50 miles in length. At present it is impossible, on account of legislative restrictions, to provide routes of that length. The motor vehicle has revolutionized the means of conveyance everywhere, and its value should not be curtailed in its application to problems of transportation in the Postal Service any more than it is in its usefulness in the commercial world.

It was found possible during the year just closed to supersede 47 star routes of a total length of 428 miles with rural mail routes. This vastly improved the service and effected an annual saving of \$30,074.22.

Of the 43,098 rural carriers in the service on June 30, 1919, the average annual pay, including motor-vehicle service, was \$1,470.84. For horse-drawn routes the average pay was \$1,457.28.

Despite the fact that rural service has been extended to 5,886,000 additional patrons since 1914, including 1,492,280 during the past

year, a comparison of the rural population for 1910 with the number of such population having mail service shows there are about 9,718,000 persons, equivalent to approximately 2,100,000 families, without rural mail service. These persons are entitled to this service which could not be supplied under the old system of indiscriminately laying out and establishing rural routes. It is the purpose of the Post Office Department to continue its policy of equitable extension of rural routes until all of these are supplied with mail facilities to which they are justly entitled.

Great progress in the further extension of mail facilities to a large proportion of the rural population not now provided could be accomplished through the improvement of the highways.

It is evident that the successful operation of rural delivery is dependent upon the character of the highway over which it is performed, and therefore this department is deeply concerned in the improvement of the highways, not only because of the economy of operation, but also because it would permit the more rapid extension of mail service to all possible rural patrons. This explains the activity and interest of the department in the improvement of roads. In 1913 there was available in the postal appropriation \$500,000 to be expended in cooperation with the several States for experiments in the construction and improvement of highways. Because of the effective results attained through the application of this small appropriation, and the continued activity and interest of this department, there is to-day available for the next three years the sum of \$200,000,000, which will aid very materially, when a similar sum has been provided by the States for this purpose, in the extension and improvement of new highways, and resultant improved mail facilities to the farmer producer, who may then lessen the difference in amount of parcel-post mail matter delivered into rural territory, which averages six pieces per route per day, as over against one piece per route per day collected from rural territory. Through such improvement of the highways and their use in the transportation of foodstuffs, it would be possible to convey an average of not less than 1,800 pounds per day per route, as compared with 24 pounds at present conveyed. It is only through the efficient use of improved highways that the Postal Service may perform the service to the people in aiding in the substantial reduction of the cost of living.

CHANGES IN PERSONNEL IN RURAL MAIL SERVICE.

During the year 10,429 vacancies occurred in the rural service, of which 8,615 were resignations, 404 caused by deaths, 347 by removals, and 1,063 by inductions into the military service. The increase in resignations was due to abnormal compensation paid for labor in various industrial activities.

STAR ROUTE SERVICE.

During the last few years many contractors for service on star routes have been required to make box delivery and collection service, sell stamps, and provide money-order and registry facilities to patrons domiciled on the roads covered by the routes. These additional facilities have been provided at no substantially increased expense, and have resulted in convenience to thousands of patrons, almost all of whom are remote from other postal conveniences.

The total length of the regular star routes in the United States on June 30, 1919, was 148,467.45 miles. The aggregate mileage traversed annually was 79,972,480.28 miles, at a cost per mile of 12.46 cents. The number of such routes in operation was 10,773, the annual cost of which was \$9,963,916.81. In addition, there were 151 pound-rate routes operated at an approximate cost of \$230,000.

The four-year contracts entered into by the Post Office Department on July 1, 1919, show an increase in the cost per mile of travel of 2.29 cents over the contracts for the same service which expired on June 30, 1919. This increase in the cost for star-route service for the contract section in question was due to the higher cost of equipment and maintenance and increased compensation paid to labor employed by contractors.

Under the act of July 2, 1918, which authorized the Postmaster General to investigate conditions arising from contracts in the star-route service entered into prior to June 30, 1917, with a view to determining whether readjustment should be made in the compensation rendered, allowances amounting to \$393,257.12 were made during the fiscal year on 2,317 star routes.

At the close of business on June 30, 1919, six routes with Government-owned equipment were in operation. These routes were established after it was ascertained that no proposal for the performance of the service under private contract could be had, or after proposals submitted were found to be excessive. The establishment of these routes has demonstrated that it is not only a more economical service, but that schedules can be more closely maintained, and the mail in greater volume can be more carefully and expeditiously handled. This is due to the better equipment, properly maintained, which is used, and to the further fact that more efficient men are employed by the department than by private contractors, who naturally endeavor to provide the service required at the lowest possible cost.

RURAL PARCEL-POST MOTOR-TRUCK SERVICE.

During the year 1917 the department was authorized to advertise for contracts that would require the exclusive use of motor vehicles in the transportation of mail on star routes. This marked a progres-

sive advance in postal activity, for mail is not only delivered earlier than would otherwise be possible to a large number of post offices located on branch railroad lines, but to offices from which rural routes emanate. Thus the mail from many cities is delivered 24 to 48 hours earlier than formerly, with corresponding advantages in the dispatch of outgoing mail.

At the close of the fiscal year ending June 30, 1919, there were in operation three motor vehicle truck routes. Their location, the cost of operation, the weight of mail transported, and the revenue derived is shown as follows:

Termini.	Weight (pounds).				Estimated postage.	Operating expenses.
	First class.	Second and third class.	Fourth class.	Total.		
McConne'lsburg, Gettysburg, Soudersburg, Rising Sun, Philadelphia.....	22, 109	58, 620	981, 783	1, 062, 512	\$48, 265. 81	\$15, 468. 51
Philadelphia, Wilmington, Easton.....	5, 162	21, 083	115, 953	142, 198	9, 834. 67	3, 826. 08
Washington, Gettysburg.....	20, 907	102, 000	310, 710	433, 617	39, 318. 78	10, 974. 57
Total.....	48, 178	181, 703	1, 408, 446	1, 638, 327	97, 419. 26	30, 269. 16

This service has been operated under the provisions of section 7 of the act of July 2, 1918, making appropriations for the conduct of experiments in the motor vehicle truck service. It was designed primarily to promote the conservation of farm products, to facilitate the delivery and collection in rural communities of parcel matter admissible to the mails.

When this service was first utilized, an effort was made to maintain it through connecting trunk-line routes. This policy after fair trial was abandoned as impracticable and its operation has been curtailed and is now confined to given localities.

The advantages of this service to the public seem to justify continuance of the existing routes, and when its benefits are conclusively demonstrated it might be wise to extend it to other sections. It is hoped that ultimately it may be utilized to reduce in some degree the present high cost of living.

Certain modifications of rates in postage and in packing and wrapping requirements have been made which it is anticipated will prove advantageous.

VILLAGE DELIVERY.

A new function known as Village Delivery was authorized in 1913, and at the close of that year 101 post offices had been supplied

with this service. A total of 126 carriers were employed at an average annual compensation of \$625 each. On July 1, 1919, the service was in operation at 570 offices, with 852 carriers employed at an average annual compensation of \$783 each.

EQUIPMENT AND SUPPLIES.

Early in the present administration the Division of Equipment, including the mail bag shops and mail lock shops, was transferred from the Bureau of the Second to that of the Fourth Assistant Postmaster General, and consolidated with the Division of Supplies under the designation of Division of Equipment and Supplies. This was done because it was recognized that the functions of the Division of Equipment included distribution as well as mechanical operations, a character of work similar to that of the receipt and distribution of supplies, performed by the Division of Supplies.

At that time deplorable sanitary conditions, which grew up prior to 1913, prevailed in the workshops. The health authorities had complained for years concerning these conditions.

The mail lock and mail bag repair shops were housed in a building unfitted for mechanical operations. It was the best that could be had in the circumstances, the Government being under contract to continue, at an exorbitant figure—\$32,000 per annum—the rental of the building in which the shops were located. The working conditions were such that the employees engaged in the repair of mail bags were compelled to wear dust-protecting devices, and there was continual complaint of the effect of the filth and dust upon the health of the working force. Such improvement as was possible in a poorly designed structure was promptly made. Cleaning devices were installed, so that every mail container sent to the workroom for repairs had as much of the dirt and dust removed from it as was possible. Ventilators and fans were provided to remove whatever dust and impure air accumulated.

Notwithstanding the improvements that had thus been effected, the maintenance of efficient operation and the continued care and precaution required to prevent disease were rendered so difficult that the department was compelled to call upon the Supervising Architect of the Treasury Department for an estimate of cost for the construction of a modern shop building. This estimate, submitted under date of September 3, 1914, indicated that the proposed building alone would cost in the neighborhood of \$400,000, and that in the regular course of the work of construction of Government buildings under the direction of the Supervising Architect it would be impracticable to even begin "to prepare plans and specifications until after the commencement of the calendar year 1920." Because of the urgent need of the building the Postmaster General sought relief from the

Congress and an appropriation of \$200,000 was asked for and given with which to purchase land and erect a factory building.

The department entered into contract with private contractors for the construction of this building and it was completed in April, 1918, one year and five months after the contract had been let. The cost of the site and the building combined was less than \$200,000 and the building completed and ready for occupancy at least two years earlier than it otherwise would have been. The building is situated on the corner of Fifth and W Streets, NE., a steel and concrete manufacturing establishment, second to none in the city of Washington, fireproof and sanitary, thoroughly lighted and ventilated.

In this building, with employees working two shifts of eight hours each, the Post Office Department is manufacturing and repairing practically all the mail bag and mail lock equipment, as well as many other items of equipment used in the Postal Service. This equipment is being manufactured and repaired at less cost than had been possible through contract with individuals, firms, or corporations, although the department strictly observes the law providing for an eight-hour day, usual holidays, and disability leave, and without the employment of child labor.

Substantial increases in salary have been granted employees in the mail equipment shops. The improved efficiency of the employees and their hearty cooperation has warranted an increase in salaries of from 25 to 50 per cent since 1913, and this, too, without increasing the unit cost of the article repaired. The cost of manufacturing and repairing sacks and pouches during the present year is less than that during 1914.

In 1914 there were 88,184 sacks repaired per month at a unit cost of 7.7 cents, as compared with 232,642 sacks repaired in a single month now at a unit cost of 7.4 cents. While 19,994 pouches were repaired per month in 1914 at an average unit cost of 13.4 cents, such repairs are now being made at a unit cost of 11.2 cents, notwithstanding the fact that on July 1, 1919, not a single employee engaged in such repair work will receive less than \$3 per day. This applies to the employee who has had at least one year's experience on the duties to which such employee may be assigned.

During the year 1918, when the department was unable to secure a reasonable proposal for the manufacture of mail bags, on account of conditions incident to the war, 472,350 No. 1, class A, mail sacks were manufactured in the department mail bag shop at a unit cost of 18.9 cents for labor, material, and all overhead expenses, as compared with the lowest proposal tentatively submitted by a manufacturer for making this style of sack at 33.9 cents, a saving of 15 cents per sack to the Government, aggregating \$70,852.50 on this one small lot of mail containers alone.

With the introduction of parcel post the character of mail matter has been changed. Two or three pieces of mail will fill an ordinary mail container, whereas formerly thousands of pieces of letter mail could be carried in a single mail sack. It is, therefore, obvious that a very large increase in the quantity of mail equipment is necessary. Through the careful selection of lighter canvas it was possible for the department to bring about substantial savings of money, with no loss to the serviceability of the mail-bag equipment. An instance which is typical of this saving was in making 472,350 mail sacks, of light weight canvas, at a cost of \$712,922.97. For the same number of sacks made out of heavy canvas it would have cost the department an additional sum of \$174,769.50.

A great number of mail containers are used only during the holiday season, a period of about six weeks in the months of November and December each year, and not used during the remaining 10½ months of the year. Under such conditions it was evident that a light-weight, medium-priced mail bag would be equally as serviceable as the heavier and more expensive equipment, and acting upon this assumption thousands of dollars have been saved by the utilization of the lighter weight equipment.

During the fiscal year just closed a total of 2,532,632 bags were repaired, as against 1,875,028 for the preceding year, an increase of 657,604. Through the work of the salvage branch it was possible to restore to the service 272,986 sacks salvaged from parts of condemned sacks. In addition, 13,900 old pouches were salvaged by being fitted with new heads. It was found necessary to condemn as entirely unserviceable 279,761 bags as against 74,551 in the previous year.

Quantity production of mail bags has been undertaken for the first time in the Mail Equipment Shops, and all expectations have been met. A total of 925,983 new mail containers were supplied the service during the year, consisting of 877,656 sacks and 48,327 pouches. Of this total, 472,350 of the sacks were manufactured in the equipment shops, not only within the required time but at a cost of \$80,000 under the lowest bid received from commercial concerns. The shops also manufactured and supplied the necessary cord fasteners, grommets, and other metal attachments for the bags referred to. In addition, 10,368 pieces of equipment and attachments were produced for other executive departments and the postal establishment of the Philippine Islands.

In order to handle the increased routine work and the manufacture of new equipment in the shops the personnel was practically doubled and a night shift inaugurated, which will be retained as long as the needs of the service warrant it.

New machines have been installed in the lock shop and constant attention is given to improved methods of operation. An automatic die for bending cord fastener and label case bottoms has been installed, which turns out 30,000 to 40,000 pieces per day, as against from 12,000 to 16,000 under the method heretofore in use. There has been adopted a new method of punching mail sacks for grommets, whereby all of the holes are punched at one operation instead of individually, with the result that an expert operator using this method turns out eight times the work formerly done in a given period. An automatic die for making grommet rings at one operation has been installed which enables one pressman to do the work of two, and in addition releases one press for other uses. A new design of two-piece grommet in lieu of the three-piece formerly used results in a considerable saving of material.

To provide greater security in the transportation of mail matter, a lock cord fastener is now being experimented with which will still further reduce the cost of the construction of cord fasteners and provide greater safety to the mail matter within the container to which they are attached.

Nearly 1,000,000 mail locks, lighter in weight, smaller in size, and far more efficient in service, have been designed and placed in use. Where formerly possibly more than 40,000 locks were returned annually, less than 2,000 now appear.

The cost of repairs has been reduced to a nominal figure, while the cost of manufacture of each lock has been reduced from 18 cents to less than 8 cents.

When this administration assumed control of the postal establishment the Postal Service was using approximately 2,400 canceling machines, which were designed to impress a date and cancel the postage stamps attached to mailable matter. Of this number 1,960 were rented from two or three manufacturers who held patents upon various parts of the machines, and the rental amounted to \$300,000 per annum. Proposals were submitted to the owners of these devices to purchase them, and prices for the highest grade product, ranging from \$575 to \$1,100 were received. Upon the expiration of the agreements for the lease or rental of the machines the appropriation provided for such lease or rental was used for the purchase of the machines, and to-day there is not a canceling machine in the Postal Service leased or rented.

With this money the department is now extending the introduction of these devices to hundreds of offices that have heretofore been compelled to use the slow and inefficient hand-canceling method. It is anticipated that in the near future every post office above that of fourth class will be provided with a mechanical canceling device that will improve the efficiency of operation in such offices, and that

this service will be operated at an aggregate expense not to exceed \$100,000 per year.

In the Division of Equipment and Supplies many new mechanical and labor-saving devices have been improved and perfected. Patrons of the Rural Delivery Service have expended in the neighborhood of \$50,000,000 for letter boxes, and realizing that many of these devices were sold and distributed at exorbitant prices, the department designed a uniform type, and those that are now distributed to the rural patrons are all subject to the approval of the department, such approval including, in addition to the material used, the cost or price at which it is sold to the public. Thus, the department endeavors to protect the patron in the quality of the letter box purchased and in the reasonable cost to him.

The repair of scales has been resumed in the shops and it has been found possible to place 8-ounce scales in serviceable condition at a unit cost of \$0.81 as against \$3, the cost of a new scale.

The carpenter shop has been provided with additional machines and turned out 492 distributing cases and other equipment during the year at prices materially under those of outside bidders.

Only by the transfer of unused postal equipment and supplies and the adoption of methods heretofore found unnecessary in their distribution was the Division of Equipment and Supplies enabled to overcome during the war the embarrassment caused by the failure of some of the contractors to make prompt deliveries. Considerable difficulty was experienced in meeting the needs of the Postal Service for official and registry envelopes. This was due not only to the failure of the contractor who supplied this particular item, because of war and labor troubles, to fulfill his obligations, but also to the fact that the requirements of the service for envelopes were greater during the war than during normal times.

Because of the abnormal demands made upon the Postal Service, growing out of the war, a largely increased amount of equipment came into the Mail Equipment Shops for repair. This was occasioned by the fact that practically every piece of postal equipment is now constantly in active service, whereas in prior years there were slack periods when considerable part of such equipment was stored in depositories.

During the fiscal year just ended the Postal Service consumed 70 carloads or about 2,100,000 pounds of twine. It is interesting to note that in the fiscal year 1910 the Postal Service used 84 carloads or about 2,520,000 pounds of twine, notwithstanding that at that time the amount of mailable matter was not half as great as it is at the present time. This net reduction of nearly one-half million pounds of twine per annum followed an intensive campaign to im-

press upon postal employees the necessity for careful saving and re-use of every pound thereof.

Notwithstanding the distribution of 2,000,000 pounds of twine, the distribution of all war-savings certificates and thrift cards used throughout the country, and all other items of vastly increased quantities of necessary supplies and equipment so essential to the successful operation of the Postal Service, there has been no substantial increase in the cost of such distribution. This has been due to a great extent to the establishment during this administration of specified distributing offices where supplies and equipment are shipped in large case and freight lots, and thence distributed on short hauls to post offices dependent upon the central distributing offices for their supplies.

At present there are central distributing offices in 37 of the States and Territories and the system is rapidly being extended to the remaining States.

In an effort on the part of the Post Office Department to cooperate with the War and Navy Departments in meeting their increased demands occasioned by stress of war for typewriting machines there was a slight reduction in the number of machines furnished the Postal Service during the current year. However, it was necessary to purchase more adding machines than heretofore, owing to the increased work placed on all postmasters through the sale of war-savings stamps, thrift stamps, and other war activities. During the fiscal year just ended the service was supplied with 936 typewriters and 513 adding machines.

Owing to the need of metal for war purposes, postmasters were cautioned to curtail requisitions for street letter-box equipment to the lowest point consistent with good service, and as a result fewer boxes were ordered than in previous years, although the demand has increased considerably since the ending of hostilities, and during the fiscal year just ended only 1,570 letter boxes, 500 package boxes, and 500 combination letter and package boxes were supplied to the Postal Service.

The extension of the use of electrical accounting and tabulating machines for use in money-order accounting has resulted in a great reduction in the cost of this work as well as a more expeditious auditing of the accounts.

One hundred and fifteen million eight hundred and sixty-nine thousand one hundred and fifty domestic and international money-order forms were furnished the Postal Service during the past year.

Orders were placed with the contractor for 105,194,050 official and registry envelopes.

The Postal Service required 755,757,000 ordinary printed facing slips.

Postal savings depositories were allowed 8,773,000 postal savings certificates of the various denominations.

Fourteen thousand five hundred and forty-four city delivery and collection satchels of various types were furnished the service during the past year; also 6,248 rural satchels and 194,634 tie straps for use on both rural and city satchels.

These improvements in method and increased efficiency in the detail of operation are only minor when compared with the larger field of activity in which this department has endeavored to serve the public on the principle that the postal administration should provide the maximum of service to the people at the minimum of expense to the taxpayer.

In the topography section the preparation of the post route Rural Delivery, county, local center, motor-vehicle truck, and air-mail maps has kept pace with the requirements of the service, and every effort has been made to secure the latest surveys and maps for the purpose of furnishing up-to-date information. New drawings of the post-route maps of various States and also county maps have been completed.

Semiannual editions of the post-route maps, numbering 35,000 sheets or 26,670 completed maps, also 17,754 blue prints of the rural delivery, county, and local center maps have been distributed to the service or sold to the public. In all 27,521 blue and negative prints were made during the year. Maps furnished other branches of the department for daily reference, including 598 post-route maps, have been corrected to date, the average number of hand corrections monthly being 21,377.

Parcel post unit numbers for all new and changed-site offices have been determined for publication in the Official Postal Guide, and all offices have been kept supplied with the parcel post zone keys for determining parcel-post rates.

A number of modern and improved methods have been adopted in the topographic section and its usefulness to the service greatly increased.

COST ACCOUNTING.

The cost-accounting system (first introduced during this administration as a part of the modern shop practice) in effect in the equipment branch has proven very helpful in the conduct of shop operations and has resulted in standardization of methods and material economies.

PURCHASES.

The procurement and distribution of supplies for the Postal Service was rendered increasingly difficult before the armistice by freight congestion in the East, fuel shortage, priorities on munitions and sup-

plies for the Army and Navy, shortage of labor, and other like conditions incident to the war. It became necessary for the purchasing agent to obtain coal and in some cases even labor for a great number of contractors and subcontractors, also to make scores of applications for priority orders and for authority to make shipments. Prices increased to abnormal levels, and in a great many cases it was impossible to obtain goods at any price, at least for anything approaching prompt delivery.

The greatest difficulty was caused by the franked envelope situation, the demands of the Government, due to the war, increasing many hundred per cent, so that approximately 1,000,000,000 franked envelopes were purchased by the various departments of the Government during the last year of the war, which, of course, far exceeds the ordinary consumption.

So tremendous were the demands of the War Department, especially for overseas shipments, and of the Navy and other departments who had to do with the prosecution of the war, that all contractors got behind with orders, and at one time it seemed doubtful whether enough envelopes could be obtained in the country to meet the Government's needs. To complicate the situation, contractors were complaining that the cost of production had increased enormously, and that they were losing heavily, some of them being threatened with bankruptcy. To furnish relief Congress authorized an adjustment to apply to all deliveries during the fiscal year. The Federal Trade Commission, in conjunction with the War Industries Board, was requested to investigate the cost of production as of July 1, 1918, and an adjustment of prices was made accordingly approximating about 100 per cent. This applied not only to franked envelopes, but to money-order forms, blanks, blank books, and other stock, also to the Postal Guide. In the previous year an adjustment of the stamped-envelope contract had been effected under a clause of the contract authorizing new styles and designs, approximating about 50 per cent.

The envelope contractors were affected like all other manufacturers with the scarcity of labor, fuel, and material, likewise with railroad congestion. These conditions became so acute that in the summer and autumn of 1918 the purchasing agent of the department took steps in conjunction with the War Industries Board to mobilize the entire envelope industry of the country. The President set aside a fund for this purpose, and arrangements were made for the Government to purchase paper and to allocate orders among all envelope manufacturers whether previously Government contractors or not. The armistice came, however, about the time it was prepared to carry this plan into effect, and it was therefore abandoned. New Government contracts for franked and stamped envelopes were

entered into at prices averaging about the same as those covered in the adjustment previously mentioned.

The duties of the purchasing agent were also greatly increased by the turning over to the Post Office Department of motor trucks, motor cycles, and aeroplanes no longer needed by the War Department. Requisitions were placed for between fifteen and twenty thousand motor trucks, motor cycles, and aeroplanes. Only about 2,000 trucks, 1,000 motor cycles, and 100 aeroplanes were delivered during the fiscal year, but preparations were completed for the delivery of a larger number.

With the cessation of hostilities the procurement and movement of supplies have been less difficult, although prices still remain abnormally high, and material has been hard to get. This applies especially to certain grades of paper. Twine that previously cost the Department 9 and 10 cents now costs nearly 30. Other cotton goods have gone up almost as much, thus greatly increasing the cost of mail bags and satchels. The prices of other supplies have been affected accordingly, and on the whole it is safe to say that supplies and equipment for the Postal Service cost on an average of 50 to 100 per cent more than before the war.

LIMIT OF WEIGHT OF FIRST-CLASS MATTER INCREASED.

Pursuant to the policy to promote the usefulness of the postal service and extend its facilities, recommendation was made in 1915 for increasing the limit of weight of first-class mail, such limit then being 4 pounds. The recommendation was embodied by Congress in the act of May 18, 1916, making the weight limit for first-class matter the same as for parcel-post matter. The additional facilities made possible by this provision have not only proven advantageous and convenient to patrons of the service but the provision has considerably augmented the postal revenue. A provision of the same act prohibits the acceptance for mailing under the penalty privilege of any article or package exceeding 4 pounds in weight unless it comes within certain specific exceptions, the purpose of the provision being to relieve the postal service of handling and transporting free of postage official matter weighing more than 4 pounds, not coming within the exceptions, which the various Governmental establishments have for mailing. However, such official matter weighing over 4 pounds is mailable under postage at the rate for the class to which it belongs.

INCREASE OF LIMITS OF WEIGHT AND SIZE, REDUCTION OF POSTAGE RATES, AND OTHER EXPANSIONS OF PARCEL-POST SERVICE.

At the time the parcel-post service was established the weight limit for parcels was fixed at 11 pounds for all zones and the limit of size

at 72 inches in length and girth combined. These limits were soon found to be so restrictive as to preclude the shipment of many articles and consequently curtail the usefulness of the service. In order that the people might enjoy the full benefits which the parcel post is designed to afford, early steps were taken in accordance with the procedure provided by the parcel-post law to broaden and liberalize the scope of the service.

The first modification, effective August 15, 1913, was to increase the limit of weight for the first and second zones from 11 pounds to 20 pounds and reduce the rates of postage for those zones. On March 16, 1914, books were added to the parcel-post classification. Seeds, plants, bulbs, etc., were also accorded the parcel-post zone rates under an amendment to the original law approved March 9, 1914.

On July 1, 1914, the weight limit for the first and second zones was increased from 20 to 50 pounds, and for all other zones from 11 to 20 pounds. At the same time the rates of postage were reduced in the third, fourth, fifth, and sixth zones. In order to accommodate shipments customarily made in standard commercial containers slightly exceeding the 72-inch size limit prescribed by the original parcel-post law, the limit of size was increased on July 10, 1915, to 84 inches in length and girth combined.

The limit of weight of parcel-post matter was further increased, effective March 15, 1918, from 50 pounds to 70 pounds for parcels mailed for delivery in the first, second, and third zones, and from 20 pounds to 50 pounds for all other zones. In connection with the conduct of experimental motor-vehicle truck routes and country motor-express routes authorized by Congress the local parcel-post rate of postage was extended in September, 1919, to fruits and vegetables mailed at any post office or point on such a route for transportation over the same and delivery at some other post office or point along the same route.

FORWARDING AND RETURNING UNDELIVERABLE MAIL OF THE SECOND, THIRD, AND FOURTH CLASSES.

In the last three annual reports the department recommended legislation permitting the prompt forwarding or return of undeliverable perishable matter and the forwarding or return of other undeliverable fourth-class matter and that of the second and third classes bearing the pledge of the sender to pay such postage upon delivery of the matter. A bill embodying such recommendation has been recently enacted into law. This law will expediate the handling and disposition of undeliverable matter, relieve the postal service of considerable labor and expense and be of great convenience and advantage to the public generally, since it will no longer be necessary to hold such mail at the office of original address pending the notifi-

cation of the addressee or sender and the receipt from him of the forwarding or return postage, as heretofore required. It will be of particular advantage in the case of perishable matter which often spoiled before the required postage could be furnished under the former procedure, which imposed inconvenience, hardship and loss upon the sender or addressee.

FREE MAIL PRIVILEGE.

In previous reports reference has been made to the enormous amount of matter carried in the mails from which no revenue was derived. The mailings of second-class matter free in the country of publication amounted during the past fiscal year to 56,480,618 pounds, and it is estimated that the free mailings of the Congress and various Government establishments under the franking and penalty privileges were considerably in excess of this. There was, in addition, a large amount of matter mailed free by soldiers, sailors, and marines stationed abroad, by certain agricultural colleges and experiment stations, and also that pertaining to cooperative agricultural extension work, copyright matter, literature for the blind, etc. Notwithstanding the enormous and constantly increasing burden thus imposed upon the postal service, there are occasional efforts to secure the free-mail privilege for other purposes. Since, as pointed out in reports heretofore, the expense incurred in handling and transporting free matter must be defrayed from the receipts from the revenue-producing mail, thus imposing a greater charge on such mail than is necessary to cover its own cost, it is not believed, in view of the interest of the general public, that there should be any further extension of the free-mail privilege.

Reference has been made in previous reports to abuses of the franking privilege which occasionally arise. The enactment of legislation such as is embodied in the printing bill now pending before Congress will go far toward confining the franking privilege to its legitimate function and reduce the amount of franked mail to a minimum.

RECEIPTS FROM POSTAGE.

The receipts from postage paid on mail matter, constituting the principal source of the postal revenue, amounted during the last fiscal year to \$398,582,668.13, or 91.37 per cent of the total revenues, an increase of 10.86 per cent over the postage receipts of the previous year. Mailings of second, third, and fourth class matter without stamps affixed, on which the postage was collected in money, produced \$26,517,548.04 of this amount. The remainder, \$372,065,120.09, was derived from the mailings of the various classes on which the postage was paid by means of stamps. The average per capita expenditure for postage for the year was \$3.70.

The provision of the war revenue act of October 3, 1917, increasing to 3 cents an ounce or fraction thereof the rate of postage on letters and other first-class matter, except drop letters on which the rate was fixed at 2 cents an ounce or fraction thereof at all offices, and increasing the rate on postal and post cards from 1 cent to 2 cents each, was repealed by the revenue act of February 24, 1919, effective July 1, 1919, on which date the former rates of postage on first-class matter again became applicable. The estimated additional postage collected during the fiscal year 1919 as a result of the increased postage rates on matter of the first class amounted to \$71,392,000. The total estimated amount of such additional postage collected during the entire period this provision was in effect, namely, from November 2, 1917, to June 30, 1919, was \$115,892,000.

Exclusive of the estimated postage resulting from the increase in the rate on first-class matter under the act of October 3, 1917, the postage receipts for the fiscal year 1919 amounted to \$327,190,668.13, or \$3.04 per capita. This was an increase over the fiscal year 1913 of \$79,994,844.16, or 52 cents per capita. These figures strikingly illustrate the wonderful expansion of the postal service during the last six years and indicate that the postage receipts have not only kept pace with the increase in population but that the individual is making greater use of the postal facilities.

The war-stamp tax on parcel-post matter provided for by the act of October 3, 1917, was continued by a provision of the revenue act of February 24, 1919, under which parcels of fourth-class or parcel-post matter chargeable with 25 cents or more postage are subject to a tax of 1 cent for each 25 cents postage charge or fraction thereof, such tax being payable by means of internal-revenue stamps affixed to the parcels.

The postage charge on aeroplane mail was originally fixed at 24 cents for each ounce or fraction of an ounce upon inauguration of the aeroplane service on May 15, 1918. This was reduced to 16 cents for the first ounce and 6 cents for each additional ounce on July 26, 1918. In both cases 10 cents of the initial charge was for special-delivery service. On November 30, 1918, the uniform rate of 6 cents for each ounce or fraction thereof was made applicable to aeroplane mail, and this rate was further reduced on July 18, 1919, to 2 cents for each ounce or fraction thereof, special-delivery service being accorded such mail upon payment of the regular 10-cent fee required for this service in addition to the postage.

ACCEPTANCE OF MATTER FOR MAILING WITHOUT STAMPS AFFIXED.

With a view to promoting the efficiency of the Postal Service and increasing its usefulness to the public, steps were taken in 1914 to extend the provision for the acceptance of identical pieces of cer-

tain classes of matter for mailing under what is known as the permit system without stamps affixed and the collection of the postage thereon in money, this method of prepaying the postage having proven highly advantageous both to the public and Postal Service, for the reason that it relieves mailers from the labor and expense of affixing and the Postal Service from canceling stamps on such matter, and thus not only effects a material economy but expedites the dispatch and delivery of mail. Legislation recommended by the department and embodied in the act of May 18, 1916, reduces the minimum number of identical pieces of third and fourth class matter which may be accepted for mailing without stamps affixed, the postage being paid in money, from 2,000 as originally fixed by the act of April 28, 1904, to 300 and 250 pieces, respectively, and extends the privilege to such second-class matter, mailed in quantities of not less than 300 identical pieces, as was previously required to have the postage paid with stamps affixed. These modifications and extensions have enabled many persons and concerns to avail themselves of the privileges of the permit system who could not formerly do so. This system has proven so highly advantageous that it is recommended that the provisions of the act of May 18, 1916, for mailing matter under permit without stamps affixed, the postage being paid in money, be extended to mailings of first-class matter in quantities of not less than 300 pieces.

POSTAL SAVINGS SYSTEM.

When this administration assumed office in March, 1913, there were approximately 312,000 depositors in the postal savings banks of the country, with slightly over \$30,000,000 to their credit, and the average per capita deposit was \$96.23. At the close of the fiscal year 1919 there were 565,509 depositors, with \$167,323,260 to their credit, and the average per capita deposit was \$295.88. The amount on deposit at the close of each fiscal year covered by this period, and the increase in deposits during each year, were as follows:

Fiscal year ended June 30—	Amount on deposit.	Increase in deposits.	Fiscal year ended June 30—	Amount on deposit.	Increase in deposits.
1913.....	\$33,818,870	\$13,581,786	1917.....	\$131,954,696	\$45,934,811
1914.....	43,444,271	9,625,401	1918.....	148,471,499	16,516,803
1915.....	65,684,708	22,240,437	1919.....	167,323,260	18,851,761
1916.....	86,019,885	20,335,177			

These figures reflect the marked growth and development of the system during this period and give rise to the inquiry as to how the forward movement was brought about.

One of the first steps taken was to transfer the business of the system, together with its corps of employees, to the bureau of the Third Assistant Postmaster General, in furtherance of the policy to assign to one bureau, in so far as possible, all functions and duties of related character. A reorganization of working force and a revision of business methods was begun immediately thereafter and no opportunities have been overlooked to substitute simple and direct methods for cumbersome, time-consuming and vexatious procedure. The business of the system is now efficiently and expeditiously conducted and is giving satisfaction to its patrons. The effect of the improved methods is well exemplified by a statement of the reduction in the staff at the central office of the system in Washington. On May 1, 1913, the date the transfer became effective, there were 176 employees in the Division of Postal Savings and the pay roll for the fiscal year 1914 amounted to \$205,528.32. On July 1, 1919, notwithstanding that the deposits had more than quintupled in the meantime, there were only 78 employees and the pay roll for the fiscal year 1919 amounted to only \$111,034.32.

One of the most pronounced obstacles to the growth and development of the system was the provision contained in the organic postal savings act limiting the amount that may be accepted from a depositor to \$100 in a calendar month and the maximum balance at credit to \$500. These limitations on deposits were precautionary, and while they unquestionably served a purpose when the service was new and in a sense experimental, the principal factor which led to the adoption of them was the fear expressed by the savings banks of the country that many of their patrons would withdraw their deposits and transfer them to the postal banks. It was conclusively shown, however, that substantially all postal-savings deposits represented the savings of wage earners who had implicit confidence in the Government and would not patronize private savings institutions, and that while millions of dollars had been called from hiding places and turned back through the medium of the postal banks into the commercial activities of the very localities from which they were drawn, yet the usefulness of the service was seriously impaired because of the hindering restrictions. Moreover, a still more serious effect than the loss to business of the rejected savings, a large percentage of which was sent abroad, was the confused thought and consequent lack of confidence manifested by prospective depositors of foreign birth, who could not understand why the Government would stand ready to safeguard a part of their savings and not all of them.

On the recommendation of the department the Congress, on May 18, 1916, amended the original postal savings law by removing altogether the provision limiting the amount that may be deposited

monthly, and increasing the amount that a depositor may have to his credit at interest from \$500 to \$1,000. Discretionary authority was also given to accept additional deposits, not to exceed \$1,000, on which no interest should be paid. Difficulties incident to the acceptance of a new class of deposits, however, requiring the adoption of new forms and accounting rules, led to the postponement of the authority to accept the noninterest-bearing deposits. Subsequently, on July 2, 1918, the Congress, on the further recommendation of the department, again amended the law by repealing the authority to accept noninterest-bearing deposits and increasing the amount that a depositor may have to his credit at interest from \$1,000 to \$2,500. A study of the above table giving the yearly increase in postal-savings deposits will show the tangible results which followed the removal of the hindering restrictions. While the response to the extension of the maximum deposit to \$2,500 was not so great as for the previous extension to \$1,000, it should be taken into account that the last extension came during the floating by the Government of popular loans calling for billions of dollars and that the subscriptions to these loans were paid very largely from the savings of the people. The substantial increase in postal savings deposits concurrent with the period of Government financing is a sure test of the place which the postal savings service fills with the people of the country, particularly when it is taken into consideration that the interest yield on the Government bonds recently floated is much greater than on postal savings deposits.

Among other progressive steps urged by the department and adopted by the Congress may be mentioned the repeal of the statutory requirement that special or distinctive stamps should be used on official mail matter relating to the system and extending the use of "penalty" envelopes therefor; the repeal of the authorization for the payment of additional compensation to postmasters of the fourth class on account of postal-savings business transacted by them, the amount that might accrue to them under the statute being infinitesimal when compared with the expense of ascertaining and distributing it; the extension of the laws authorizing the allowance of claims for losses of postal and money-order funds, stamped paper, etc., to include postal-savings funds, cards and stamps, and certificates; and the discontinuance of the 10-cent savings card, provided for in the original postal-savings act as one of the means of evidencing small deposits, and substituting therefor a card, to be furnished free, to which 10, instead of 9, savings stamps may be attached, thus reducing by one-half the accounting made necessary by the maintenance of both cards and stamps.

There has been a marked reduction in the number of post offices designated as postal-savings depositories, in furtherance of a deci-

sion made early in this administration to maintain the service at a post office only when a demand for the facility is shown by the residents of the community which the post office serves. It had theretofore been the intention, evidently, to extend the service to all post offices, and upward of 13,000 post offices had been designated as depositories. But it was found that several thousand offices, chiefly those serving small rural communities, had transacted no business at all and it was unlikely that they would do so. Immediate steps were taken to withdraw the service where it was not patronized, and the withdrawal has been continued until at the present time only 6,439 post offices, including 724 branches and stations, transact postal-savings business. The number of depository offices has, therefore, been reduced by more than one-half, with a substantial decrease in the expense of administering the system. On the other hand, the service has been extended to every post office where it was shown that savings facilities were needed, notably to post offices in Alaska, the Hawaiian Islands, and Porto Rico. The extension of the system to our outlying possessions involved the solving of a number of problems, chiefly those concerning the availability of funds; but, happily, all obstacles were overcome and the residents of these sections are now enjoying savings facilities of which, due to their remoteness, they were very much in need.

At the close of the fiscal year 1919 postal-savings funds were on deposit, at interest, in 5,211 banks which had qualified to receive them, 3,239 being national banks, 1,161 State banks, including the Territorial banks of Alaska, Hawaii, and Porto Rico, 271 savings banks, 531 trust companies, and 9 private banks under State supervision.

One of the most important provisions in the postal-savings law is the privilege extended to depositors of converting their deposits into Government bonds of small denominations. These bonds are issued semiannually in registered and coupon form in denominations of \$20, \$100, and \$500, are payable in gold coin in 20 years and redeemable at the pleasure of the United States in 1 year, bear $2\frac{1}{2}$ per cent interest, and are free of all taxes whatsoever. Their parity is maintained by the standing offer of the board of trustees of the system to buy them from holders at their face value. During the fiscal year 1919 deposits to the amount of \$194,220 were converted into these bonds, the total amount of deposits converted since the system was organized being \$11,453,100. The board of trustees purchased from holders \$1,325,160 of these bonds during the fiscal year 1919, their total purchases at the close of the year amounting to \$5,288,600. Many of the bonds were sold by the holders for investment of the proceeds in Liberty bonds and war-savings stamps.

The board also purchased \$25,000,000 of Liberty bonds during the year for investment.

A study of postal-savings statistics brings to light many interesting facts. It is shown that 75 per cent of the total deposits on June 30, 1919, were held at 100 post offices having approximately \$200,000 and over on deposit. The cities and towns served by these post offices are principally industrial communities, and the patrons of the postal bank are of the class to whom the post office is familiar ground; it is convenient, the hours of business are suitable to their pursuits, and they use it freely and extend to it their full confidence. More than half of the depositors are of foreign birth and have approximately 70 per cent of the deposits to their credit. To this class of people the postal-savings bank fills an important place in national life. They were familiar with postal banks in the land of their birth and turn to them naturally in the land of their adoption. The establishment of the service in this country undoubtedly has done much to further the Americanization movement. The ability of the foreign born to place their funds safely in this country instead of sending them to the postal banks at home, as was their practice for many years prior to the time postal banks were established in this country, has done much to sever ties which played a very important part in retarding the progress of these people toward full citizenship.

It may be asserted with confidence that the establishment of postal savings banks in this country, with the avowed purpose of encouraging economy and thrift and enabling the people to own Government bonds of small denominations, played an important part in the successful placing of the Government war loans. Those charged with the duty of installing and developing the banks soon learned that the advantages of every new public facility must be kept constantly before the people until the number of individuals making use of it is sufficient to give it a status as an accepted and familiar function of government, particularly so when the individual is called upon to change his manner of daily living in order to avail himself of the benefits of the facility. It is a well settled fact that the savings habit must not only be aroused—it must constantly be fostered. Profiting by this experience the department lost no opportunity to keep the advantages of the postal savings banks before the people during the years which preceded the World War, and during the continuance of it up to the time the Government financing began. This activity no doubt did much to dissipate the thought among the people that the underwriting of Government loans was the peculiar function of the banking world and that only the wealthy could be bondholders; it familiarized the people generally with Government bonds of small denominations, and placed many of them in a position financially where they could acquire them.

Payment of the deposits standing to the credit of deceased or legally incompetent depositors is effected speedily and with simple formality. When the amount is over \$250 payment is ordered on presentation of letters of administration. When the amount on deposit is less than that amount the department, in order to conserve the estate, undertakes to pay the deposits direct to the person or persons who, under the laws of the State of domicile of the decedent, would be entitled to receive them if administration were had. By these means nearly 17,000 accounts have been settled and over \$3,600,000 of deposits paid, and many thousands of dollars in court costs and legal fees have been saved to the heirs. There was a marked increase in the number of these cases handled during the fiscal year 1919, when 5,376 accounts were closed and \$1,652,518.60 paid, an increase over the previous year of 98 per cent in the number of cases and 166 per cent in the amount paid. The cases adjusted included 36 accounts requiring payment through consuls of foreign countries stationed in the United States to heirs residing abroad, and 34 accounts of depositors who entered the military and naval services of the United States and gave their lives for their country.

The balance sheet of the system and a detailed statement of operations will be found in tables in the appendix to this report.

MONEY-ORDER SYSTEM.

While in some respects money-order transactions during the fiscal year 1919 reflected the generally unsettled condition of business, it is noteworthy that the volume of domestic business transacted was very great, the increase over the previous year being one of the most phenomenal ever recorded in the history of the money-order service. During the seven fiscal years from 1913 to 1919, inclusive, the amount of domestic money orders issued has increased over 90 per cent. The law enabling money orders to be paid at any money-order post office, the extension of the service to naval vessels, and the action of the department in providing money-order facilities for the American Expeditionary Forces in foreign countries have undoubtedly contributed largely to this remarkable increase. Detailed references to the establishment of these features will be found in succeeding paragraphs.

The amount of international money orders issued for payment in foreign countries has steadily fallen off since the beginning of the World War, until during the year 1919 the value of such orders was less than for any similar period in 15 years. The suspension of the money-order conventions with certain European nations, the great army of foreigners who have returned to their native countries since 1914, and the violently fluctuating exchange rates are the principal contributing causes.

A detailed statement of money-order transactions will be found in the appendix to this report.

By reason of the extension of the Rural Delivery Service, causing the discontinuance of many post offices, the number of money-order offices was reduced from 55,668 on June 30, 1918, to 54,826 at the close of the same month in 1919. The service was installed at 554 post offices and discontinued at 1,393, a net decrease of 839 offices.

To provide for the prompt payment of money orders the amount of money-order funds known as "reserves," which postmasters are authorized to retain on hand, was increased \$257,375 during the year, amounting on June 30, 1919, to \$5,404,570.

The department received complaints with regard to the alleged wrong payment of 1,333 money orders, amounting to \$20,430.66. Of these orders 218, aggregating \$3,113.49, were found upon investigation to have been properly paid, while the sum of \$12,939.99, representing 792 of the orders, was recovered from the persons to whom it had been improperly paid. Because of the failure of paying officials to observe the necessary precautions \$4,244.80, represented by 315 orders, was collected from postmasters. In eight cases it was found that the wrong payment was not due to any fault of postmaster, remitter or payee, and the department therefore assumed the loss, which amounted to \$132.28.

Especial attention was given by the department during the year to complaints from soldier payees of the failure to receive money orders drawn in their favor. All such cases were accorded immediate consideration, and where it appeared that an order had been lost a duplicate was issued and forwarded at the earliest practicable date. When inquiry disclosed that the order had been paid to a person for whom it was not intended, the case was at once referred to the chief post-office inspector for investigation.

The demand by the traveling public and others that money orders be made payable wherever presented became so persistent that in 1914 the department recommended to Congress the enactment of legislation authorizing the Postmaster General, under such rules and regulations as might be necessary, to direct that money orders be paid at any money-order post office regardless of the one named in the order as the paying office. An act embodying these features was passed by Congress and received the approval of the President on February 6, 1914. In accordance with the authority thus granted, regulations were promulgated by which money orders issued at offices within the continental United States, except Alaska, may be paid at any money-order post office within the continental United States, except Alaska, if presented within 30 days from date of issue. After 30 days the orders may be paid only at the office on which drawn, or repaid at the office of issue. Patrons of the money-

order system have taken advantage of this privilege very generally, and it has undoubtedly added much to the popularity of the service.

In 1913 a committee was appointed, consisting of the Third Assistant Postmaster General, the Auditor for the Post Office Department, and representatives from the offices of each of these officials, to make a survey of the postal money-order system for the purpose of ascertaining its condition and advancing its efficiency and economical administration. The committee found that one considerable item of expense was that connected with the payment of money orders at the large post offices, and recommended the adoption of a mechanical accounting system involving the use of punched cards and electrical tabulating and assorting machines. The system was first installed at the Philadelphia, Pa., post office and proved of such value that it has since been extended to seven of the largest post offices. By adapting these devices to the peculiarities of money-order business an annual saving to the department in clerical salaries of more than \$200,000 has been effected, and the time required to answer inquiries of the public concerning the payment of orders has been very materially shortened. The system will be installed at other offices where the volume of business justifies its use as rapidly as the necessary mechanical apparatus can be obtained.

During the fiscal year 1915 arrangements were concluded with the officials of the Navy Department by which, under certain regulations, money orders may be issued and paid by Navy mail clerks on board certain designated vessels. This facility not only has increased the amount of money-order business transacted but by reason of its convenience to enlisted men has contributed materially to the maintenance of morale among sailors and marines. The war ships are designated as stations of the New York City post office and the money-order accounts are rendered to the postmaster of that city. At the close of the fiscal year ended June 30, 1919, there were 84 such stations authorized to transact money-order business.

With the entry of the United States into the European conflict steps were immediately taken to provide the members of the American Expeditionary Forces with money-order facilities. Under the general superintendence of a postal agent in Paris, branches were established in France, Italy, and the occupied portion of Germany, where domestic money orders could be purchased or cashed in the same manner as at post offices in the United States, and at the same rate of fees. Arrangements were completed by which the foreign currency in which the troops were paid could be converted into dollars for money-order purposes at the rate prescribed for Army transactions. The estimation in which this service was held by the troops is best evidenced by a statement of the volume of business

transacted. During the period from July, 1917, to June, 1919, 1,578,371 orders were issued for \$30,421,879.25, and in the same period 450,303 orders were paid for \$10,557,108.79. This service, which enabled the men to send to their relatives in the States a portion of their Army pay, and to receive remittances from home, undoubtedly played a very large part in keeping members of the forces contented under the trying situations in which they were placed.

On the 1st of August, 1914, a new and uniform schedule of fees was adopted for international money orders drawn on countries with which business is conducted through exchange offices. The new schedule was compiled with a view to correcting inequalities in charges which previously obtained and which were the cause of many complaints. It will be noted that the new fees went into effect coincident with the outbreak of the European war and its effect in increasing the business can not, therefore, be determined. It has, however, been very effective in diminishing complaints and obviating the confusion at international post offices where it was necessary to consult three fee schedules before issuing international money orders.

The conventions under the terms of which international money-order service is conducted provide that in unusual circumstances the service may be temporarily suspended. With the opening of hostilities Austria, Belgium, and Egypt notified the United States of the suspension of money-order business. Subsequently business was suspended with Germany, Greece, Hungary, Liberia, Mexico, and Portugal. At the close of the fiscal year 1919 business had been resumed only with Belgium and Mexico. Prior to August, 1914, representations had been made to the various Central and South American countries with which money-order conventions have not been concluded looking to the exchange of postal money orders. The negotiations were of necessity suspended during the continuance of the war because of unstable exchange rates, but recently the interrupted correspondence has been resumed with the result that conventions have been concluded with Brazil and Nicaragua, and money-order business will be established with these countries in the near future.

The balances arising out of international money-order business, whether due to or by the United States, are settled by means of bills of exchange. Balances due by this country are settled by bills purchased in New York City. Under normal conditions, by competitive buying, the department is enabled to make a slight gain on such transactions, but with the very beginning of the war the exchange market became thoroughly demoralized. Exchange on all European countries at first was quoted at such exorbitant rates that the department found it necessary to restrict the amount of money orders which would be sold to one person for payment in foreign countries.

This effectually prevented speculation by private bankers and commercial interests, which had been attempted, but even in handling this restricted business the department sustained some loss in the settlement of balances. Under these conditions the Third Assistant Postmaster General gave his personal attention to the purchase of exchange, and as a result, by closely studying the market, was enabled to reduce the loss to a minimum and, when the market showed a more favorable turn, to realize considerable gain on purchases of exchange.

During the fiscal year ended June 30, 1919, bills of exchange were purchased amounting to \$27,627,703.44. On these purchases a gross gain of \$1,005,320.68 was made, from which should be deducted a loss of \$419,655.09, leaving a net gain of \$585,665.59.

Since July 1, 1912, the bills of exchange purchased by the department on money-order account have totaled \$307,761,330.40. The loss to the department during that period, because of the purchase of bills at rates higher than the rate named in the money-order conventions, has amounted to \$1,333,681.48. Purchase of exchange at rates less than the money-order conventions, however, have resulted in a gain of \$6,386,317.61 leaving a net gain for the seven-year period of \$5,052,636.13.

The effect of the exceedingly unsatisfactory condition of the foreign-exchange market is not confined to the transaction of international money-order business; practically the entire business world is adversely affected. There is urgent need for a stabilization of business conditions, and this will relieve the foreign-exchange market from the violent fluctuations to which it is now subject. As soon as the business of the world is again on a solid foundation, this department will propose to foreign postal administrations a readjustment of the terms of the money-order conventions.

REGISTERED MAIL.

There was a substantial increase in the number of domestic letters and parcels registered during the year 1919 over the previous fiscal year. Fees were paid on 50,129,296 pieces, an increase of 12,531,830 over the previous year, with a corresponding increase in revenue from this source of \$1,253,183.

There was a decrease of 10,399 pieces in the number of foreign letters and parcels registered. The amount of mail registered for delivery in foreign countries has been curtailed for several years on account of conditions brought about by the World War. There will doubtless be a steady increase in foreign registrations coincident with the return to normal conditions.

Official free registration was given to 10,833,616 pieces of mail, as compared with 6,987,950 pieces in the preceding fiscal year. The

extraordinary increase in the number of official free registrations is attributed largely to the war activities of the Government.

The total registrations, paid and free, numbered 65,373,394, as against 49,006,297 in the preceding year.

During the fiscal year 1919, 3,343 claims for indemnity for the injury or loss of registered mail were approved, calling for the payment of \$44,993.45. In the previous year 3,251 claims were approved for indemnities amounting to \$38,943.66. These figures do not represent net loss to the Government, as reimbursement for an indemnity paid is frequently obtained by collection from the postal employee, contractor, or other person responsible for the loss.

The registration privilege was withdrawn from fourth-class mail on January 1, 1913, coincident with the installation of the domestic parcel post, and the insurance feature substituted. The number of domestic paid registrations immediately dropped, and continued to do so for several years, partly to this cause and partly to conditions brought about by the war. There has been complete recovery, however, so that the number of registrations on mail matter other than that of the fourth class is now far in excess of the number of registrations before fourth-class mail was withdrawn.

During the past seven years many improvements have been made in the registry system with a view to increasing its usefulness to the public and to save time and labor in the Postal Service. Among the more important of these improvements may be mentioned the abolishment of the distinctive registry stamp, the misuse of which led to annoying complications more than offsetting the advantages gained; the requirement that postmasters at United States exchange offices shall collect the deficiencies on short-paid registered mail addressed for delivery in foreign countries; changes and consolidations in registry forms and in the manner of billing registered mail; the establishment of the registered paper-jacket service with Canada; special arrangements for dispatch and delivery of registered mail between financial institutions; simplified arrangements for the delivery of registered mail and the introduction of a registry receipt that can quickly be filled out and delivered.

The registry service was used extensively for war purposes. Not only the Treasury, but the military and naval establishments, the Department of Justice, and other branches of Government found the service invaluable to them in the transmission of valuable and confidential communications, matter relating to the military draft, and the like. Financial departments of the Government, Federal reserve banks, and monetary institutions generally are constantly increasing their use of it for the transmission of packages of unusual value, consisting of coin, currency, bonds, certificates, etc. The people generally also are using it, not only for the transmission of

valuable mail, but for communications for which an acknowledgment of receipt is desired.

INSURED PARCELS.

In accordance with the provisions of section 8 of the act of Congress approved August 24, 1912, establishing the domestic Parcel Post Service, provision was made for the insurance of parcels accepted for mailing and for the indemnification of the senders in case the parcels were lost. This feature of the service has been a success from the start and its growth has been phenomenal. At the inauguration of the Parcel Post Service on January 1, 1913, a flat fee of 10 cents was charged, which insured a parcel against loss for the actual value of its contents, not exceeding \$50 in any one case.

During the first six months of the operation of the service, that is to say, from January 1 to June 30, 1913, inclusive, 2,595,185 parcels were insured. The fees collected therefor amounted to \$259,518.50. There were 1,090 claims approved during the same period on account of the loss, rifling, or total damage of such parcels involving the payment of indemnities amounting to \$10,385.60, an average of \$9.53 per parcel.

Effective July 1, 1913, a reduction was made in the fee scale so as to provide for the insurance of an article against loss for its actual value, not in excess of \$25 in any one case, upon payment of a fee of 5 cents. This action greatly stimulated the ordinary parcel traffic as well as the insured business and met an important public need. During the fiscal year ended June 30, 1914, following the introduction of the reduced fee scale, upwards of 13,000,000 parcels were insured, or more than twice the number of parcels sent by registered mail before the parcel post was established. During the fiscal year ended June 30, 1915, more than 18,000,000 parcels were insured. The marked increase in business during the fiscal years 1914 and 1915 clearly demonstrated that the usefulness of the insurance feature should be extended and that a further reduction in the fee scale should be made, whereupon a departmental order was issued, effective September 1, 1915, providing for a fee of 3 cents for insurance not exceeding \$5, and a fee of 25 cents for insurance not exceeding \$100. In the fiscal year ended June 30, 1916, approximately 25,000,000 parcels were insured. Experience gained in administering the service further proved that provision should be made for another progressive step, namely, the indemnification for partial injury to insured parcels as well as for total injury or loss. Congress giving the desired authority a departmental order to effect the purpose was made to become operative in respect to parcels mailed on and after August 8, 1916. In the fiscal year 1917, approximately 34,000,000 parcels were insured. On July 1, 1917, the use of insurance tags on insured

parcels was discontinued, and in place thereof a coupon receipt was given to the sender and a record made of the parcel at the mailing office. During the fiscal year ended June 30, 1918, over 50,000,000 parcels were insured.

In the fiscal year 1919, the number of parcels insured reached the amazing total of 69,997,889, an increase of 19,578,281 over the preceding year, and 56,634,430 over the fiscal year 1914, the first full year during which the insurance feature was available. The great increase in business during the fiscal year 1919 is due largely to the increase of the limit of weight of parcels to 70 pounds when mailed in the first, second, and third zones, a maximum distance of 300 miles, and to 50 pounds beyond.

Thus the remarkable growth of the insurance feature of the parcel post is traced to the continuous efforts of the department to enhance the service by means of successive improvements and reductions in the fee scale.

Provision was also made for furnishing receipts to senders of parcels not insured upon payment of a fee of 1 cent. This receipt carries no indemnity features; it is merely evidence of the deposit of the parcel in the office of dispatch.

Claims for indemnity to the number of 191,538 were paid during the fiscal year 1919, amounting to \$1,499,412.90, an average of \$7.81 per piece of mail. These figures are not fairly representative of the losses which have accrued in that year inasmuch as patrons are allowed six months from the date of mailing in which to file their claim for loss or injury, and many claims are filed, considered, and paid after the close of the year in which the loss or injury occurred.

COLLECT-ON-DELIVERY SERVICE.

This facility was made available to patrons of the parcel post on July 1, 1913, and enabled the sender of a mailable parcel, on which the postage was fully prepaid, to have the price of the article and charges thereon collected from the addressee on payment of a fee of 10 cents, provided the amount to be collected did not exceed \$100. The payment of this fee also insured the parcel against loss, without additional charge, in an amount equivalent to its actual value, but not to exceed \$50.

The coupling of this feature with the new Parcel Post Service had the effect of stimulating mail-order business by making it unnecessary in many transactions for purchasers to pay in advance or for sellers to extend credit. The "C. O. D." feature immediately became very popular by reason of the many purposes for which it could be utilized, its simplicity of operation, and the promptness with which collections were returned to the senders. During the fiscal year ended June 30, 1914, the first year it was in effect, nearly

3,000,000 parcels were handled, involving total collections of over \$14,500,000, and on which the money-order fees alone exceeded \$168,000. In the following year over 4,700,000 parcels were handled, and the growth thereafter continued unabated until in the fiscal year ended June 30, 1919, 14,383,668 parcels were handled, an increase of 4,738,811, or 49.13 per cent over the previous fiscal year. The fees collected on 1919 business amounted to \$1,473,960.

Effective July 1, 1917, the collection-on-delivery rates were changed to require the payment of a fee of 10 cents for a collection of \$50 or less, and 25 cents for a collection over \$50 and not in excess of \$100, in order to conform to the insurance rates. On the same date the limits of indemnity for which the department was liable for injury to or loss of such matter were increased to provide for \$50 for a 10-cent fee and \$100 for a 25-cent fee. The need for the change was evidenced by the fact that over 132,000 parcels were mailed at the 25-cent rate during the first fiscal year of its operation.

Shortly after the service was inaugurated complaints reached the department calling attention to the practice of certain firms in sending articles collect-on-delivery to persons who did not order them. Prompt measures were taken to eliminate this fraudulent practice, and certain firms which persisted in it were prosecuted in court. These measures had the desired effect, only an occasional complaint now being received. Prompt measures also were taken against the equally fraudulent practice of sending in a "dummy" or "fake" package containing no fourth-class matter, a bill, whether receipted or not, for the purpose of having the service collect an old debt.

During the fiscal year 1919, 18,846 claims for indemnity for the loss to or injury of C. O. D. parcels were approved, calling for the payment of \$165,255.45, an average of \$8.77 per parcel.

STAMPED PAPER.

Audited sales of stamps and other postage stamped paper in the fiscal year 1919 amounted to \$392,965,009.74, an increase of \$38,995,148.01, or 11.02 per cent, over the preceding fiscal year. The gain is due in part to the increased rates of postage which were not in force during the first four months of the preceding year. Sales of war-savings and thrift stamps, less thrift stamps exchanged, amounted to \$524,501,217.29, and of proprietary and documentary stamps to \$10,516,008.85. The value of stamped paper of all kinds sold by the Postal Service during the fiscal year 1919 therefore amounted to \$927,982,235.88, an increase of 29.89 per cent over the sales of the preceding year. A summary of the transactions will be found in the appendix to this report.

During the past year the activities of the department with reference to stamp issues have been more varied and extensive than ever before in the history of the Postal Service. In addition to the usual duties of supervising the production, issuance, and redemption of postage stamps, postal cards, stamped envelopes and newspaper wrappers, the issuance of war-savings, thrift, and documentary stamps, and the accounting which attends these functions, the following has been accomplished:

A 6-cent airplane stamp, a 3-cent "Victory" stamp, and a 13-cent stamp for payment of registry or special-delivery fee and a single rate of letter postage, were issued and placed on sale.

Special postage stamps surcharged "Shanghai, China," were issued for sale by the United States postal agency at Shanghai.

The 56,000 post offices of the country were stocked with 2-cent adhesive postage stamps and stamped envelopes and 1-cent postal cards in anticipation of the reduction on July 1, 1919, of the war-time rates of postage.

Preparations were made to retire the outstanding 3-cent postage stamps and stamped envelopes and 2-cent postal cards rendered unserviceable by the reversion to prewar rates.

Post offices were stocked with the 1919 issue of war-savings stamps.

Post offices were stocked with proprietary internal-revenue stamps, in compliance with the law providing for their sale by the Postal Service.

The unsold war-savings stamps of the 1918 issue, to the number of 57,345,943, were retired and destroyed.

Preparations were made for the issuance of \$100 Treasury savings certificates.

The stamp system has been in use in the Postal Service since 1847, and at the present time approximately 90 per cent of the postal revenues are collected through the use of stamped paper. The many extensions of the stamp system to various Government activities connected with the collection of the revenues and financial operations generally have demonstrated its great worth and efficiency. During the last six and a half years the Post Office Department has put out many new issues to meet the constantly changing conditions and developments in its service, and mention may be made of the following:

Postage stamps in denominations of 7, 9, 11, 12, 13, 20, and 30 cents.

Stamp books containing 96 1-cent, 24 1-cent and 24 2-cent, and 12 3-cent stamps.

Two-color stamp of \$2 and \$5 denominations.

A 3-cent "Victory" stamp.

Airplane stamps in denominations of 6, 16, and 24 cents.

Stamps overprinted "Shanghai, China," for use on mailings from the United States postal agency at Shanghai.

Two-cent postal cards.

Three-cent stamped envelopes.

New design of 1-cent postal cards.

New design of 1, 2, 4, and 5 cent stamps on embossed stamped envelopes.

War-savings stamps, series of 1918 and 1919.

Thrift stamps.

Documentary internal-revenue stamps.

Proprietary internal-revenue stamps.

Stamped envelopes of a new grade of paper, known as "extra quality."

Window stamped envelopes (envelopes which are ready for mailing without either addressing or stamping, thus eliminating two office functions).

Under a new contract effective July 1, 1919, the cost to the department of stamped envelopes and newspaper wrappers was increased, and as the law provides that stamped envelopes shall not be sold at less than the cost thereof, in addition to their postage value, corresponding increases were made in the scale of selling prices. The increased prices necessarily applied to the stamped envelopes held in stock in post offices throughout the country, which the department had purchased from the contractor at the old prices. A profit to the postal revenues estimated at \$130,000 will ultimately accrue to the postal revenues from this source when the old stocks are sold.

Following is a summary of the value of postage stamps, postal cards, and stamped envelopes, issued to postmasters, and the audited sales thereof, during the fiscal years 1913 to 1919, inclusive:

Fiscal year ended June 30—	Issues to postmasters.	Sales by postmasters.
1913.....	\$260,977,247.11	\$239,749,038.55
1914.....	263,945,840.79	258,421,952.04
1915.....	267,718,981.74	256,037,008.51
1916.....	286,940,837.31	277,608,304.86
1917.....	314,582,960.72	295,173,821.09
1918.....	387,992,228.61	353,969,861.73
1919.....	444,046,285.72	392,965,009.74
Total.....	2,226,204,382.00	2,073,924,996.52

It will be noted that the stamp sales, with the exception of the fiscal year 1915, in which business suffered serious depression due to war conditions, increased substantially year by year and now approach the \$400,000,000 mark.

Transactions incident to the issue of postage stamped paper run into totals almost beyond human comprehension. There were 609,853 requisitions for postage stamps and other stamped paper filled in the fiscal year 1919, calling for 15,142,453,359 adhesive stamps, 466,924,490 postal cards, 1,844,884,905 stamped envelopes and newspaper wrappers, 133,180 international reply coupons, 59,625 postal-savings cards, 548,400 postal-savings stamps, 152,384,640 war-savings stamps, 165,144,700 thrift stamps, 131,178,741 documentary and 188,570,500 proprietary internal-revenue stamps. The total number of units issued was 18,092,282,540, an increase of 1,612,679,607, or 9.79 per cent, over the previous year. The stamp books totaled 32,200,765 and the coils of stamps 2,517,474.

The value of damaged postage stamped paper redeemed from postmasters during the past year was \$1,632,719.37; of postal-savings issues, \$2,520,757.70; of war-savings and thrift stamps, \$155,574.74. The routine redemptions therefore amounted to \$4,309,051.81, to which may be added the special redemption of retired 1918 war-savings stamps, amounting, as stated elsewhere in this report, to \$286,729,715.

The loss of postage stamps by burglary has continued to decline, notwithstanding that the average quarterly value of post office stocks in 1919 was \$40,000,000 in excess of the average quarterly value for the previous year. Claims to the number of 302, for \$56,329.44, were received during the fiscal year 1919, a decrease of 13 per cent under the previous year. This does not include, however, 198 claims for losses of war-savings stamps, valued at \$167,688.22, which were also received during the year. A comparison of claims for losses of postage stamps by burglary received during the fiscal years 1913 to 1919, follows:

1913	\$117, 734. 59
1914	148, 770. 45
1915	197, 011. 88
1916	144, 440. 54
1917	80, 040. 46
1918	64, 675. 91
1919	56, 329. 44

The decline year by year since 1917 is due to increased activities of postmasters and post-office inspectors, under direction of the department, to protect the outstanding stocks of stamps, and also in no small degree to the central-accounting system, which makes the holding of large stocks in the district post offices unnecessary.

The accounting by postmasters for war savings and thrift stamps involved the rendition and audit of about 50,000 monthly accounts.

current during the fiscal year just closed. A compilation of the audited accounts shows that the gross sales of war savings and thrift stamps by the postal service during the fiscal year amounted to \$598,005,122.29. This is approximately 83 per cent of the value of all war savings and thrift stamps sold, the remaining 17 per cent being sold by the Treasury Department and through Federal reserve banks.

The retirement of the 1918 issue of war-savings stamps as of December 31, 1918, necessitated the return to the department for redemption of all unsold stamps in post offices. Stamps to the maturity value of \$286,729,715 were so received and destroyed. The task of counting the returned stamps and the stating of credits due 4,000 accounting postmasters was accomplished by a joint committee, made up of representatives of the Post Office and Treasury Departments, in a period of 39 business days.

The instructing of postmasters in matters relating to the registration and payment of war-savings stamps, the securing from them of the necessary proof required by the regulations governing payments for stamps belonging to deceased owners, and for registered stamps that have been lost or destroyed, and for other cases in which special authority for payment must be obtained from the Treasury Department, creates a steadily increasing volume of correspondence, and has necessitated the development of an administrative system to handle it and the organization and training of a special correspondence force.

The act of Congress approved March 3, 1917, authorized the designation of districts and of central offices in such districts, for the economical distribution of supplies and the administrative examination of accounts. Under this authorization the "central-accounting" system has been inaugurated, the plan being to designate a post office in each county to supply the smaller offices in the county with stamps and to clear their postal accounts. The new system reduced the number of stamp charge accounts maintained in the department at Washington, and the number of stamp accounts to be rendered to the department, to be audited and recorded therein, from approximately 56,000 to 4,000. It also placed the source of stamp supply much nearer to the smaller post offices, enables them to obtain stamps more promptly, and to keep smaller stocks, thus lessening the risk of loss by fire and burglary.

Mechanical office equipment installed in the division of stamps has effected improvement in the methods of filling requisitions of postmasters, recording them, keeping the accounts and reviewing monthly and quarterly reports. Original requisitions are filed in lieu of book accounts, thereby eliminating individual charge ledgers.

DIVISION OF DEAD LETTERS.

In March, 1913, a complete survey of the activities of the Division of Dead Letters was inaugurated, which resulted in the immediate improvement of the sanitary conditions incident to the treatment of undelivered mail in the department. Tons of undelivered matter were disposed of forthwith. Thousands of communications received daily, upon which treatment was necessarily delayed, because of the inefficient methods involved in the examination and manipulation thereof, were more promptly acted upon, so that no letter mail remained on hand more than 24 hours. Thousands of pieces of merchandise, mailed as parcel post and lost in transit, were given immediate attention, instead of treatment after days and sometimes weeks of delay. All of this improvement was due to the use of modern mechanical devices, such as lightning letter openers and the introduction of modern office practice.

While under the supervision of the Fourth Assistant, the cost of handling undelivered mail had been reduced approximately \$100,000 per annum, although a vast additional amount of fourth-class or parcel-post mail appeared for treatment.

After the preliminary improved methods had been adopted it was apparent that this function was coincident with the treatment of mailable matter in post offices, and the division, in its improved condition, was transferred to the Bureau of the First Assistant.

In 1913 the sending of undeliverable postal cards and post cards, amounting to approximately 1,000,000 pieces per month, to the Division of Dead Letters was discontinued, and they are now disposed of by the various postmasters where they accumulate. During that year time-saving devices, such as letter-opening machines and an improved sealing machine, were installed. In July, 1913, the Postal Laws and Regulations were amended so as to require the direct return from post offices of address to foreign administrations through the respective exchange offices of all prepaid undeliverable foreign matter sent to this division, thus avoiding delay in returning such matter to the countries of origin. During that year an order was issued requiring the sending of parcel-post matter to postmasters at headquarters of the 15 divisions of the Railway Mail Service. This saved the accumulation of a very large quantity of such matter at Washington, thus avoiding the cost of unnecessary transportation and providing for the quicker return of articles to senders where they could be identified. During 1914 a card-index system was adopted for recording letters containing valuable inclosures, discontinuing the old method of making such records in bound volumes.

At the request of the Department an item was contained in the appropriation act of July 28, 1916, reducing the limit of time that letters containing valuable inclosures should be held awaiting reclamation, from four years to one year. An order was also issued that year reducing the time for holding parcel post matter awaiting reclamation, from 12 months to 6 months. These regulations saved much time and expense in handling undeliverable mail and prevented an unnecessary accumulation at headquarters.

Under authority of the act of August 28, 1916, branches of the Division of Dead Letters were established in New York, Chicago, and San Francisco for the disposal of undeliverable mail originating in States adjacent to those cities. Mail from the New England States and from the State of New York is sent to New York city, while 14 States send mail to Chicago, and 8 States and the Territory of Alaska to San Francisco. Mail from the other States and the District of Columbia is sent to the Division of Dead Letters at Washington. The work of these branches has been merged with the work of the post office where located, with little increase in force, while it has been found possible to materially reduce the number of employees in the Division of Dead Letters.

During the war much extra work was required of the Division of Dead Letters in cooperating with the Board of Censorship with the censorship work.

On April 7, 1917, an order was issued, directing that all letters or packages originating within the United States or its possessions and destined for Germany and the other Central Powers allied with Germany in the conduct of the war should be sent to the Division of Dead Letters. Under this order, approximately 500,000 letters and parcels were sent to this division, and for a time some 40 or 50 translators from the Department of Justice were working in conjunction with this division in the handling of such mail.

The net revenue derived from the sale of parcel post and unclaimed letters for the fiscal year ended June 30, 1913, amounted to \$31,645. While for the year ended June 30, 1919, the net revenue amounted to \$199,222. Of this amount \$123,520 was realized from the sale of parcel post.

The division is more than self-sustaining at the present time, whereas it was operated at a loss at the beginning of the six years' period noted.

The receipts of letters and first-class mail in the Division of Dead Letters and the branches thereof at New York, N. Y.; Chicago, Ill.; and San Francisco, Calif., for the fiscal year ended June 30, 1919, aggregated 22,982,605 pieces, an increase of 8,530,652 over the preceding 12 months. Of the number received, 8,055,989 were

returned to senders, and 107,408 filed for reclamation. The abnormal receipts may be attributed largely to conditions growing out of the war, as approximately 6,000,000 undelivered letters were returned to the dead-letter service from the American Expeditionary Forces, and nearly 2,000,000 from the several military camps in this country. Such of these letters as it was necessary to open to identify the writers were found generally to contain personal correspondence only which did not disclose sufficient information to secure return to the senders and consequently they were destroyed. The unusual receipts may also be attributed in part to the mailing of letters by soldiers abroad inclosing personal messages only directed to persons who had apparently removed from the address given and could not be located. Over a million and a half of letters which did not bear the sender's return card, and were so carelessly or incompletely and insufficiently addressed that they could not be delivered, were received in the Division of Dead Letters. Each of these letters represents a loss in the minds of the senders, and it is evident from these facts that the exercise of reasonable care in the addressing of mail matter would do as much as any one thing to maintain an efficient and satisfactory mail service.

The additional work required in the treatment of this unusual number of letters fell more heavily and directly on the Division of Dead Letters and the dead-letter branch at New York than on the branches at Chicago and San Francisco. The receipts of the division increased 2,004,102 letters, and the receipts of the New York branch 5,897,549, and although the reports of the remaining branches showed that more than normal conditions prevailed the amount received did not so fully reflect the effect of the war on the volume of matter handled.

In examining opened letters 1,030,449 were found to include articles of value other than correspondence and they were therefore made a subject of record. Of these 69,641 contained money which with currency found loose in the mails amounted to \$159,532.44. United States bonds, War Savings certificates, and similar inclosures aggregated 1,530, valued at \$3,638.37; and checks, drafts, money orders, and inclosures of like character were found in 138,697 letters with a nominal value of \$4,851,011.21. In the preceding year there were received a large number of letters containing small amounts of money and addressed to persons or firms classed as "fraudulent," consequently a comparison of the reports does not fully indicate the additional work performed in the treatment of letters inclosing currency.

The revenue from the dead-letter service amounted to \$182,917.99 in money removed from letters, found loose in the mails, received for

postage, or derived from the sale of parcels, and \$16,304.12 from postage stamps withdrawn from letters or found loose in the service, a total of \$199,222.11, or \$105,870.23 more than for the preceding year.

Undeliverable parcels and articles of merchandise found loose in the mails and turned in to this division, or to post offices at the respective division headquarters of the Railway Mail Service, amounted to 653,106 pieces, 419,146 of which were addressed parcels, and 233,960 articles were so insecurely wrapped that they were found loose in the mails. In the treatment of these parcels 230,307 were restored to owners and 341,338 held for reclamation. The remainder, 81,461, consisted of matter without obvious value or articles of a perishable character which could not be held awaiting application therefor. The sale of parcel-post matter held for six months, after careful effort had been made to secure its restoration to the owners, produced a net revenue of \$123,520.28.

INSPECTION SERVICE.

At the beginning of the present administration the Postmaster General found that the important position of chief post office inspector, which was at one time in the classified civil service, had been taken out of it by an Executive Order of date January 4, 1910, and a man without the Postal Service was given this very important assignment. The Postmaster General recommended at once that it be restored to the classified service, and under date of May 7, 1913, this administration showed its belief in the justice and propriety of recognizing merit and efficiency in the civil service by restoring the position to its former standing. The Postmaster General thereupon selected for the position a regular, classified, civil service employee, who had entered the service originally in a low-grade position and after 25 years of meritorious and efficient work had demonstrated his fitness for the position of chief post office inspector.

The inspectors' force is the only arm of the Postal Service where it becomes necessary to know the political affiliation of those who compose it. The reasons for this will readily suggest themselves to one of thoughtful mind. The inspectors are the eyes and ears of the Postmaster General, through whom he gains substantially all knowledge of service conditions, and through whom he must receive information upon which conclusions are formed to base his action.

Through the inspectors come reports speaking as to the conduct and efficiency of thousands of postal employees, and upon which in all cases where complaint has been made the retention or dismissal of the employee depends. Frequently where complaint has been

made the postal officer or employee by way of defense contends that partisanship is the sole basis thereof, and in order that there may be no chance for injustice, the practice has been to detail two inspectors of opposite political faith, so that the joint report submitted by such inspectors may make it as certain as possible that considerations of partisanship shall not enter into or control the Postmaster General in any action that he may take; hence it is quite frequently necessary to have information as to the political affiliations of the members of the inspectors' force. It is true that if it were desired to use the great postal organization for partisan political purposes, the one arm of the service that could be used most effectively would be the inspectors' force, members of which are to be found in every congressional district in the country. Considering the very near power of life and death held in the hands of these officials over each postal employee within the territory falling under their jurisdiction, it can readily be seen how potential a factor the inspector could be made if those in power could bring themselves to use him for so base a purpose. Without reference to what may or may not have been done in the past, the Postmaster General when he came to the head of the Postal Establishment had a fixed purpose that the department personnel should not be used for political purposes. There has been no waver from this purpose, but on the contrary it has been at all times and under all circumstances rigidly adhered to.

An investigation of the personnel of the inspectors' force at the beginning of the present administration disclosed that of the 395 inspectors then in the service, approximately 90 per cent of them were not only affiliated with one particular political party but apparently had been selected from one faction of that party. Many States like Mississippi and Vermont had no representation in the inspectors' force, whereas many other States, like Indiana and Ohio, had more than their just quota of representation therein. This may have been accidental; or, it may have been the inevitable result of the continued control of one political party for a long term of years; but whatever the reason or causes that brought about this condition, it existed, as has been stated. Of course, such conditions should not be permitted to continue. The Postmaster General could not with fairness to the membership of the inspectors' force effect at once a change of the conditions referred to. He reached the determination, however, that the best interests of the service required that this inspectors' force be fairly apportioned between the States, each to receive without reference to whether it was a certain or a doubtful political State its just quota, and that the whole number of inspectors should be equally divided between the

political parties. Once determined upon, this policy was conscientiously adhered to and faithfully carried out. As has been stated, it could not be done at once, but as vacancies occurred through deaths, resignations, removals, and reassignment, the positions were filled in strict conformity with this policy. In order that no injustice should be done to any inspector in the force by sudden or arbitrary action, it required nearly four years before the desired result could approximately be brought about. Finally, on February 16, 1917, the President at the request of the Postmaster General issued an Executive order to the following effect:

Hereafter, in filling vacancies in the force of post-office inspectors, the Postmaster General shall apportion them by States, based as nearly as possible upon population as determined by the last decennial census. The force shall also be apportioned fairly between the political parties, and advancement in the service shall be based upon merit.

At the present time the inspectors' force is made up of the chief inspector and seven inspectors-in-charge who are of one political affiliation and eight inspectors-in-charge who are of another political faith. The inspectors are fairly apportioned, each State having its just quota, and they are equally divided between the political parties; thus, each inspector now knows that his promotion is dependent alone upon merit and efficiency. This policy will continue during the present administration.

During a large part of the last fiscal year, work resulting from the state of war with Germany continued to demand the attention of the post-office inspectors. In addition to the investigations which would not be called for in ordinary times, such as those covering the need of postal facilities at military camps, shipbuilding plants, and munitions factories; the qualifications and loyalty of hundreds of applicants for positions of trust; the use of the mails for the dissemination of disloyal literature; and charges of disloyalty, there resulted a great increase in the number of irregularities which regularly fall to the inspectors to investigate. The obvious difficulties in the way of obtaining proper identification naturally caused a large number of wrong payments of money orders and wrong deliveries of registered letters, while the circulation through the mails of huge quantities of Government securities, such as war savings stamps and liberty bonds, naturally resulted in the increase in the number of all sorts of irregularities in connection with the handling of this mail.

During the fiscal year 494,104 cases were jacketed, as compared with 427,342 for the previous year, an increase of 66,762 cases. During the year the inspectors collected and disbursed in the field

\$4,963,341.06, over $2\frac{1}{2}$ times the amount collected in any previous year. Three thousand ninety-eight arrests were made, against 2,870 in 1918, evidencing the effort made by the department to apprehend those who have been guilty of the theft and rifling of matter intrusted to the mails.

Among the important criminal cases handled by the inspectors was that covering the holdup and robbery of Missouri, Kansas & Texas Railway Train No. 27, near Paola, Kans., July 10, 1918, when a number of valuable mail and express packages were stolen and some passengers and members of the train crew injured by shots. The investigation, which extended from the place where the robbery occurred to Indiana on the east and California on the west, reflected great credit on the inspectors who participated in it, not only on account of the quality of their work but on account of the results obtained, for what appeared to be one of the most dangerous bands of criminals, still in their youth, was exterminated, two members being sentenced to long terms in prison, two killed while resisting arrest, and one dying in jail.

To enable the department to readjust the pay of contractors for carrying the mails, investigations were made into the costs and different conditions on a great many routes, which resulted in saving the contractors from loss or bankruptcy and at the same time made it possible to maintain the service at fair cost.

Inspectors were called upon during the period of Government control of telegraph and telephone systems to investigate the causes and illegal conduct of individuals in strikes which occurred in many sections. About 90 cases covering strikes and charges of discrimination were investigated.

By mutual agreement with the Canadian authorities, and by arrangements made within this service economies were effected in the handling of complaints of irregularities in the foreign mails, which, in spite of the difficult clerical situation, enabled this office to keep this work practically current.

During the epidemic of influenza the service in a number of places was seriously curtailed, and in some places, especially in the West, the department was notified that post offices had been closed on account of the illness of postmasters and clerks. In such cases inspectors were notified and directed to promptly arrange for proper service.

Owing to the number of losses of parcel post packages mailed in cities of the East and destined for western points, a committee of inspectors was assigned to make an investigation. They covered the terminal facilities of the larger cities, the railway post offices,

transfer points, and shipments in storage cars. The information obtained and their recommendations were of much benefit to the department in arranging for proper safeguards to this class of mail.

The records of this office show that during the past fiscal year 23,594 complaints and inquiries were received, alleging violations of the Postal Laws and Regulations of nearly 200, having reference to the transmission through the mails of obscene, scurrilous, disloyal, and lottery matter, and use of the mails in furtherance of schemes to defraud, respectively. Such complaints have been referred to the field for investigation, resulting in a large number of successful prosecutions and the issuance of fraud orders in many cases.

Investigation of cases charging violation of the espionage act have been continued throughout the year. Among the cases of this character, based on the disloyal activities of persons engaged in the dissemination of seditious or treasonable literature, was the investigation of the operations of the I. W. W. organization at Chicago, Ill., which was notable both in the amount of work required on the part of the inspectors assigned to the case, and the volume of matter mailed out by the conspirators. By virtue of search warrants issued under the provisions of the act referred to, the inspectors seized large quantities of such literature deposited for mailing in post offices, all of which was of a questionable character and approximately 99 per cent was of a character prohibited by law.

During the year there were received reports of inspectors containing recommendations for the issuance of fraud orders in 61 cases, which were referred to the solicitor for consideration. In accordance with such recommendations, 27 fraud orders were issued. Directions to postmasters in eight instances, looking to the withholding of mail under the provisions of the espionage act, were also issued.

Owing to the increase in all lines of the work of the inspector's force, appropriations for additional inspectors and clerks have been requested in the current estimates.

ENFORCEMENT OF THE ESPIONAGE AND TRADING-WITH-THE-ENEMY ACTS.

The enforcement of the espionage and trading-with-the-enemy acts has been carried on throughout the year. The character of the disloyal and seditious matter found in the mails since the signing of the armistice has differed materially from that which the department dealt with during the prosecution of the war. It is now of a radical, revolutionary type, having for its object the solidification of the revolutionary elements in this country and the overturning of our present form of government by force.

There has been a marked increase in revolutionary propaganda, both in English and in foreign languages. The department has endeavored to deal with this matter in the most expeditious manner.

FRAUD ORDERS.

Vigorous enforcement of the laws covering the conduct of schemes for obtaining money or property through the mails by means of false and fraudulent pretenses, representations, and promises has been continued throughout the past fiscal year. Upon evidence submitted and recommendations made by post-office inspectors a large number of cases dealing with persons and concerns found to be conducting schemes to defraud the public have been considered and satisfactorily disposed of by the issuance of fraud orders or otherwise. Many of these cases were strongly contested, and the evidence frequently was of an involved character, the exercise of great care being necessary in arriving at a just decision. In all instances the department has endeavored to accord to those charged the fullest opportunity to be heard and to submit any evidence considered material to their defense. It has been the constant aim of the department to dispose of these fraud cases in the most expeditious manner consistent with a due regard for the importance of the work, and with proper precaution against doing injustice to those affected. A vast amount of money is annually saved to the public through the efforts of the department in connection with the suppression of these fraudulent schemes.

LOTTERIES. *

There was a marked increase during the last several months of the past year in the number of prize schemes to be conducted as a means of stimulating business over the number submitted during the months immediately preceding the signing of the armistice. Thus far, however, very few well-established business concerns, with the exception of certain newspapers, have returned to this expedient. Those now employing this method of increasing business are, as a rule, new in their respective fields.

BONDS OFFERED AS SECURITY FOR POSTAL SAVINGS DEPOSITS.

The number of State and municipal bond issues submitted for examination as to their legal acceptability as security for postal savings deposits decreased during the year owing to the abnormal conditions prevailing in financial circles during the war and continuing even after the signing of the armistice. However, the many projects held up throughout the country on account of the war are now being

started, and bond issues of the States and municipalities floated for the purpose of carrying out these undertakings are beginning to appear in large numbers, indicating that in due course the bond examining work will resume its former large proportions, the added value accruing to an issue of bonds after having been approved as postal savings security resulting in the tendering as such security of portions of practically all of the more or less prominent issues. Prompt examination of the issues is very necessary if the Government is to reap the full benefits of the Postal Savings System, and during the year practically all cases submitted were disposed of without delay, cooperation by the banks and bond dealers in promptly furnishing necessary data being a contributing factor in this respect.

General knowledge by bondmen of the close scrutiny by the department of the issues submitted has resulted in the offering of a higher grade of bonds than formerly.

OBSCENE AND INDECENT MATTER.

The statute prohibiting the transmission in the mails of obscene pictures, indecent post cards, publications, and other matter containing obscene or suggestive illustrations, advertisements of obscene books, pictures, etc., has been vigorously enforced, and as an appreciable reduction is noted in the quantity of such objectionable matter submitted during the past year, it is believed that the strict enforcement of this law has had good results. Under section 211 of the Penal Code the term "indecent" includes matter of a character tending to incite arson, murder, or assassination. It became necessary during the past year to refuse transmission in the mails of several publications of an inflammable character designed to incite the weak minded or vicious to acts of violence and leading to "arson, murder, or assassination."

CLAIMS OF POSTMASTERS FOR REIMBURSEMENT FOR LOSSES SUSTAINED.

During the fiscal year 550 claims were presented by various postmasters for reimbursement for losses alleged to have been sustained through unavoidable casualty such as fire, burglary, etc. Three hundred and ninety-one of these claims were approved and their aggregate, \$91,173.27, was allowed, the remaining 159 claims being disallowed as not being meritorious under the law.

COST OF THE WAR TO THE POST OFFICE DEPARTMENT.

In response to a Senate inquiry as to the cost of the war to the several departments of the Government, the report of the Post Office Department, early this year, showed that the war had entailed upon

the department an expenditure of approximately \$52,766,976 above the cost of its ordinary service. These extraordinary expenditures amount in round figures to \$30,000,000 from April 6, 1917, to December 31, 1918. Obligated expenditures and those estimated to June 30, 1919, the report stated, would amount to \$22,679,351.

STATISTICS.

Tables presenting statistical data with respect to the department's affairs and the audit of its accounts will be found in the appendix to this report.

It is felt that special recognition in this report should be accorded the officers and employees of the department who have rendered invaluable service and whose sympathetic support and assistance have been a source of great help to the Postmaster General in handling the added labors and responsibilities falling upon the department during the crucial war period.

Respectfully submitted.

A. S. BURLESON,
Postmaster General.

REPORT OF THE SECRETARY OF THE NAVY.

SECRETARY'S OFFICE, NAVY DEPARTMENT,
Washington D. C., December 1, 1919.

To the PRESIDENT:

I have the honor to submit herewith the annual report of this department for the fiscal year ending June 30, 1919, including operations, recommendations, and estimates to date.

The armistice of November 11, 1918, which marked the end of the fighting, was the signal for the Navy to undertake a stupendous task. There were more than 2,000,000 men of the Army in France who, since we entered the war, had been carried there by the transports of the whole world. A little less than 1,000,000 of them had been carried by American transports. Bringing them home was a job for the Army and the Navy working together in the close cooperation which characterized them throughout the whole war. The particular function of the Navy was to receive the men in the French harbors and land them in the United States. Assistance from foreign shipping in returning our men was almost negligible, and yet, although American transports carried less than half of the force to Europe during the 19 months between the time we entered the war and the date of signing the armistice, they brought back practically the whole force in half the time it took to carry them over. To accomplish this, every available merchant vessel was converted for transport service, every suitable man-of-war was utilized as a transport, and toward the end of the undertaking we used a number of German vessels which were turned over to us by agreement.

Obviously the stream flowing eastward could not be reversed instantly, but, after a careful survey of the situation, a tentative schedule was prepared in consultation between the Army and Navy, showing by months the number of men that the Navy believed it could carry across the water if the Army would deliver them as the ships were available. This schedule was steadily bettered as time went on, and in the month of June, 1919, 340,946 men embarked from

France. The high-water mark for a month going eastward, when desperate haste was necessary and the whole world was joining in the operations, was 311,359.

It was a matter of common knowledge that, their work well done, our troops abroad were naturally anxious to come home at the earliest possible moment, and the Navy is prouder of nothing it accomplished in the war than of this feat of bringing them home promptly, safely, and, all circumstances considered, comfortably.

Transports which had been carrying troops eastward were considerably increased in capacity, it being no longer necessary to carry guns and gun crews, run without lights, or continue the elaborate precautions against enemy attack that were essential when they were running the submarine gauntlet. In the conversion of the additional vessels made into transports the experience already gained was utilized to the utmost, but without disparaging the material side of this undertaking, which was handled with the maximum of efficiency, the credit must mainly go to the organization and operation. The work was systematized and planned ahead to the last detail and went like clockwork. No railroad operates its trains with greater system and accuracy than this ferry across 3,000 miles of water, with its storms and fogs, was conducted for months.

I may illustrate by a case which came under my personal observation which was paralleled again and again by the Navy transports. I was a passenger on the *Mount Vernon* (formerly the liner *Kronprinzessin Cecilie*) which left Brest, France, on Friday, May 9, 1919, carrying soldiers. Eight months before, it had been torpedoed, but saved by the skill and courage of its officers and crew. The day before arrival, the transport bound eastward and many miles out at sea had reported that she would reach Brest the next morning, needing no repairs, no water, no coal, and would sail for home as soon as the troops were on board. She did arrive Friday morning. Before she came in sight through the mists to the westward, her complement of troops was making its way in heavy marching order from Camp Pontanezen to the piers at Brest, there to be loaded on barges for transfer to the ship, for in Brest no transport could come alongside the piers. The vessel anchored in the harbor of Brest at 9.30 o'clock Friday morning, and at 4.25 p. m., carrying 5,800 soldiers, was again under way to the westward almost before the foam-streak of her eastward passage had disappeared. That night Capt. Dismukes stated that, with good weather, he would reach New York late the following Friday night; with bad weather, some time on Saturday. In spite of heavy seas the vessel anchored off quarantine, New York, during the night of Friday, May 16, and reached her pier early the next morning. This was not an exceptional performance; it was simply a repetition of what the same transport had done on the pre-

ceding trip, and there were plenty of cases of even shorter stays on the other side.

As may be imagined, this was a hard service. The transports were manned mainly by reservists who had enlisted for the war and were as anxious to get home as the soldiers. The department fully realized the conditions, and on every ship there was a board of officers whose duty it was to consider applications for discharge and select the most deserving cases. There was not a ship where these officers did not find great difficulty in making these selections, for the reason that there were so many more cases having the strongest claims for discharge than could possibly be released. In spite of their anxiety to get back to civil pursuits, and the great sacrifices which many were suffering through the necessity of retaining them, the naval reservists as a whole realized the situation and carried out their arduous task willingly and cheerfully. It was with profound satisfaction that the department was finally able to release these boys—for most of them were but boys—and allow them to return to their homes and families with the proud feeling of duty well done.

Next to bringing home the brave soldiers, the work of demobilization of men and ships was the duty to which the Navy addressed itself. Naval bases in France, in Great Britain, in the Azores, with large equipment, prepared for a long war, were put out of commission rapidly and without great loss. Temporary training stations and bases in this country were quickly demobilized. Only those who have gone through this process appreciate the fact that the difficulties of this going to peace are more complex and troublesome than going to war. Hundreds of ships, naval and cargo, were to be placed out of commission, some sold, others returned to their owners, and others salvaged. The strain of patrol in rough seas told upon ships as upon men.

The man power has been decreased from over 500,000 to 132,000. Of the 300,000 naval reserves all but 1,800 officers and 4,700 men have been released from active duty. The enlisted strength of the Regular Navy, which reached 218,000 in the peak of the war, has been reduced almost one half. The Marine Corps regulars numbered 65,000, of which only 17,000 remain in the service. Practically all the marine reserves have been released. The spirit of the great financier who said, "The way to resume is to resume," has characterized the Navy. When war came it practiced the maxim, "The way to mobilize is to mobilize," and it hastily drilled and trained over 400,000 new men who gave a good account of themselves on both sides of the ocean. The fighting ended, the slogan was, "The way to demobilize is to demobilize," and in spite of the varied duties, naval and civilian and relief, undertaken by the Navy, demobilization was nearly a finished fact on the day that the transports bringing soldiers canceled their

sailing schedules. The celerity of it and the efficiency of it was paralleled only by the Navy's ability to organize and increase itself many-fold and be able to say, "We are ready," from the day the President proclaimed the existence of a state of war with Germany, April 6, 1917, until the armistice silenced the guns on November 11, 1918.

It is more difficult to demobilize without essential loss than to mobilize. In mobilization the national spirit runs high; there is a goal to be reached; the effort is cumulative; pressure is felt on all sides; and the service of mass and momentum is in evidence at every stage. Mobilization was Americanism finding and vindicating itself on sea in the greatest crisis of history, the barest recital of which is epic in its reach and dramatic in its appeal.

In the present year, demobilization has claimed attention; but the task has been not merely to demobilize but to do this without disorganizing. It was not a question of untying a knot that has been successfully tied, or of undoing what has been victoriously done. It was rather a question of reshaping, rebuilding, realigning, and without the sacrifice of national spirit, unity, or force. Many new lessons have been learned, and these have been embodied in the new Navy. Experience, intelligently interpreted, is always the best teacher, and this is especially true when the experience has been spread over so great a stretch of time and space as was the case in the World War.

Two fundamental principles have been constantly borne in mind:

(1) There must be and there has been no loss of adaptability to new and unexpected issues. The readiness to hit and to hit hard, which won the plaudits of our Allies at the very outset, has been preserved in every detail of change and readjustment. The Navy is returning to a peace basis, but it is conserving the power that enabled it and will again enable it to meet with unweakened sinews any crisis that may arise. Security for the future, though an uncertain future, has not for a moment been lost sight of.

(2) There must be and there has been no loss of symmetry or wholeness in the naval organization. A reduced personnel has not been allowed to mean fragmentariness or disproportion in whole or in part. As a vast machine, as a national organism, as a complex of interacting agencies, the Navy is in form and spirit a unit, not a fraction.

Though demobilization has returned over 400,000 men from military to civilian pursuits, there are now in the Navy more than twice as many enlisted men as there were on January 1, 1917. Both the Navy and Marine Corps are at present below their authorized strength, but an active and successful recruiting campaign has been launched, and the time is not far distant when the attractions of Navy life will secure the full complements desired. Those in train-

ing and afloat are sufficient to man all dreadnaughts and modern destroyers, and the 400,000 men given naval training in war provide a naval reserve of fit and experienced men upon which the country can call in any emergency. This is an asset not before possessed in this decade and one which gives assurance until the youths coming into the service are skilled in all the callings that make up good seamen.

The United States Navy emerged from the war incomparably stronger and more powerful than ever before—second only to that of Great Britain and far in advance of any other foreign navy, in ships, in men, and every element of strength. The organization of the fleet in two great divisions gives us ample defense in the Pacific as well as the Atlantic. With battleships in service equal to or superior to any now in commission, 6 huge battle cruisers and 12 battleships under construction, a number of them larger than any now in commission, to be armed with 16-inch guns, more powerful than any now afloat, the Navy is pressing forward to greater things, justifying, in peace as in war, the country's firm confidence in its "first line of defense." The great fleets, one in the Pacific and one in the Atlantic, are powerful, well officered and manned, and give guaranty of protection and of readiness to serve our country and the world.

In aeronautics the year has been made memorable by trans-Atlantic flight, the most notable accomplishment yet achieved in navigation of the air, a United States Navy seaplane being the first to cross the ocean that divides America from Europe. The voyage of the *R-34* from England to America and return, and of our own *C-5* from Montauk to Newfoundland demonstrated the possibilities of lighter-than-air craft, and we are making every effort to achieve in dirigible balloons the same high place we have won in the production of seaplanes. The purchase in Great Britain of a sister ship of the huge *R-34*, and the construction in this country of another monster rigid dirigible, will give us two airships of the largest type. For their accommodation, as well as construction and repair, we are erecting a hangar of unprecedented size. Seaplanes, kites, and dirigibles were used with gratifying success in the fleet maneuvers at Guantanamo last spring; battleships and other vessels are being supplied with flying machines, and we are making naval aviation more and more an integral part of the fleet, to accompany our fighting ships and operate with them wherever they may sail.

One of the most hazardous tasks in which our Navy has engaged, the sweeping up of the more than 50,000 mines we planted in the North Sea mine barrage, stretching from the Orkney Islands to Norway, has been successfully accomplished by our mine force, and its vessels have returned to home waters, where the brave men who

were engaged in this dangerous service have received many proofs of the Republic's admiration and gratitude.

Its war service completed, the Navy turns to peace-time duties with the same energy, devotion and zeal which characterized it during the period of active hostilities. There are many problems still to be solved, much to be done to bring our fleet and shore establishment up to the high standard which is our goal. That these are being accomplished steadily and upon sound principles, no one can doubt who knows the service and its spirit. Progressive in peace, instant in action, it will be prepared for any duty when the country makes call upon it.

The same teamwork which marked the successful administration of the Navy in war has been in evidence in demobilization and will continue in the duties of peace. I wish to bear testimony to the united, cordial, and elbow-to-elbow cooperation in spirit as well as in performance which has characterized the men of the Navy afloat and ashore, extending from the ranking admiral to the least known youth, who soon catches the all-together spirit of the Navy.

This teamwork in war and in readjustment has not been confined to the Navy or the Navy Department. It has extended to every branch of national work. The close cooperation between the State and Navy Departments in all foreign relations and duties has been increased, and naval readiness to carry out national decrees fully demonstrated. Even before our entrance into war, the War and Navy Departments were truly two arms of one body, and our military success may be attributed to the heartiness and understanding with which we worked together in the preparation and execution of every war plan. The unexampled success of the troop movement across the seas was jointly planned and jointly carried out, and in the Navy there is gratification that, as courage matches courage in battle, cordial cooperation matches efficient coordination in conception and direction between men of the Army and men of the Navy. The relation of the Navy to the Shipping Board was so intimate that in war effort they were one, while the Food Administration learned to rely upon the Navy across the sea as its strong right arm.

Labor was the rock upon which our preparation and supplies depended. It was mobilized and efficient. Acting with closest accord with the Department of Labor, it was the privilege of the Navy to aid in stabilizing labor and in proving that the Government is the best employer. The day of giving to skill and toil a mere living wage has passed. It is entitled, after a fair day's work, to a fair day's wage, sufficient for comforts and some luxuries as well as necessities. Navy wages have never lagged. They have generally led, and for good pay it has, from its patriotic workers, received a good

day's work. Without the greatly increased production, due to the skill and industry and fine spirit of patriots in overalls, our men in arms could not have been furnished the required munitions and supplies.

The attraction of higher pay in the merchant marine has caused the Navy to lose many men, many petty officers, and not a few warrant and commissioned officers. This has made it impossible to fully man all the ships. This loss has been greater than numbers indicate, because those who have left the Navy were experienced and qualified, while the recruits now enlisting must be trained before they are fitted for the more important duties. The high wages paid to machinists, electricians, and other skilled men in private industries has prevented the Navy's securing new men in the ratings most needed. It is to be hoped Congress will increase the compensation early so that many of these men will have a suitable inducement to reenter the naval service. As a rule they prefer it to any other, but duty to their families in the time of high cost of all necessities of life has compelled them to seek places where the pay is higher.

On the 12th of November, in hearings before the House Committee on Naval Affairs, which had under consideration a bill to give an increase of 30 per cent to all active and retired naval officers and 50 per cent to all enlisted men, I advocated a graded increase based upon the necessity imposed by the enhanced cost of living. Opposing the percentage increase, I showed that the Navy Department and Congress had not been unmindful of the service and needs of men in the Navy during the war, but pointed out that the war increase through temporary promotions and commutation to officers at sea would shortly expire, and early action was needed to provide additional compensation in keeping with that enjoyed by most men in the trades and professions.

NEW FLEET ORGANIZATION—ATLANTIC AND PACIFIC.

The large increase in the number of destroyers (we will soon have 300), and the completion and commissioning of new dreadnaughts and other craft has made possible what the protection of our coasts has long demanded—the maintenance of a powerful division of the American fleet in both the Atlantic and the Pacific. It has been a source of regret to all who believe equal protection should be given to all portions of our coast that our Navy has heretofore lacked enough ships to warrant two great divisions, one in the Atlantic and one in the Pacific. It is a matter of national congratulation that our naval strength at last permits this, along with the utilization of the Panama Canal for the defensive purpose for which it was con-

structed. For years the advocates of an isthmian canal pointed out that one of its chief values and uses would be to double the effectiveness of our fleet.

ADVANTAGES OF PANAMA CANAL UTILIZED.

Shortly after the opening of the Panama Canal, the World War demanded the mobilization of all naval strength in the Atlantic, on the eastern coast and overseas. It was not, therefore, until August of this year that the canal was utilized for the chief purpose for which it was constructed when, led by Admiral Rodman's flagship, the *New Mexico*, the newly organized Pacific Fleet made its passage through that canal with the ease and celerity which justified all that its projectors and constructors claimed for it. One hundred and eighty-five ships of the Pacific Fleet, aggregating 525,000 tons, and the equal number of equal tonnage in the Atlantic Fleet, will make their passage through the canal from time to time as they come together, in drill and in maneuvers, and in competition.

"OREGON" STEAMED 68 DAYS TO REACH SANTIAGO.

The value of the Panama Canal from a naval standpoint was never before so fully appreciated. Though wise men for generations had advocated an isthmian canal, it was a real naval necessity that compelled its construction. The country felt that need sorely in 1898, when it required 68 days for the *Oregon*, then the best ship of our Navy, to reach Cuba from the Pacific Coast. It was a long trip, all the way around the Horn, and under forced draft it required more than two months to make the journey. To-day the trip from San Francisco to Cuba can be made in almost the same time as a ship could cross the Atlantic. The difference in time might mean the difference between victory and defeat, for the *Oregon* was the first-line ship in 1898, and took a leading part in the naval achievement at Santiago. If the enemy then had been stronger, it could and would have forced battle before the arrival of the *Oregon*, but with the open isthmian canal the Atlantic and Pacific fleets could carry out the plans already formulated for operating as one fleet before any enemy could try conclusions with us.

PASSING OF FLEET THROUGH CANAL MARKS NEW EPOCH.

The passing of the majestic fleet, led by oil-burning dreadnaughts and the first electrically propelled flagship, was a spectacle that marked a new epoch in history, demonstrating the wisdom of Senator Morgan, the pioneer legislator who led the way in advocacy of an isthmian canal; of the late President Roosevelt, the able and forceful Chief Executive who led the way in the construction, and

the other men of vision who saw its maritime and military importance.

AMERICA'S GREAT ARMADA ORGANIZED IN TWO DIVISIONS.

In the summer, after careful consideration, the American Fleet was organized, in two divisions, one under the command of Admiral Henry B. Wilson, known as the Atlantic, and the other known as the Pacific, under command of Admiral Hugh Rodman. The organization has been so perfected that when at stated periods they are consolidated not a single additional order will be necessary for all units of both divisions to act as one mighty fleet. The unified command is settled, and well worked out plans will make the American Fleet function with as much efficiency as if there were not two divisions in separate oceans. Indeed, the training in the two oceans will make them more fit, for in the past our dreadnaughts have practiced in only one ocean, whereas it is planned, in the course of time, for all the ships and all the personnel to sail both oceans and be as much at home in one as in the other.

INCREASES EFFECTIVENESS OF OUR NAVAL FORCES.

This new organization increases the effectiveness of our naval forces and practically doubles the field and extent of our fleet training in tactics and war problems. Each fleet is at all times within supporting distance of the other and all the ships of both could combine into one fleet before an enemy could, in any important strength, attack either coast. The Navy by this means not only protects each of our long seacoasts, but places a wall of steel around our ocean boundaries which produces a sense of security such as we have never enjoyed before.

WILL DEVELOP BASES AND YARDS ON PACIFIC COAST.

The protection furnished depends not only upon the ships themselves, but also upon the naval bases and navy yards which are necessary for the maintenance of the ships, and only their use by a large force of ships during times of peace will cause the yards and bases on the Pacific coast to be so developed as to make them ready for the conditions which would exist in time of war. The increase in the size and number of ships in the Navy already exceeds the present capacity of the yards on the Atlantic coast, and those on the Pacific must be utilized and enlarged to meet present as well as future needs.

SHIPS OF SAME TYPES IN BOTH FLEETS.

The tactical requirements which would arise when the two fleets are combined have all been foreseen. Ships of all the various

classes—battleships, cruisers, scouts, destroyers, submarines, fuel ships, and auxiliaries—have been placed in equal numbers of divisional units in each fleet so that there will be no confusion or necessity for reorganization when the two fleets come together.

NAVY MUST NOT BE ALLOWED TO "GO STALE."

The danger to every Navy after a great war, indeed the national tendency, if history is any test, is for fleets to become stale. The United States Navy in the War of 1812 saved the day after disasters on land. Our country emerged from war with a victorious Navy, comparatively strong and manned by alert and capable men of the sea who had won in a decisive sea battle with the most powerful maritime nation in the world. Within a few years our Navy had almost gone into innocuous desuetude, and no forward steps of importance were taken until in the days of Secretary Dobbin, in Pierce's administration, the construction of frigates made up the backbone of the Navy which in the sixties hastened the victory of the Federal forces, when the naval blockade literally "bottled up" the ports of the South. The pressure of this blockade squeezed her to death, and sea power was the determining factor of victory in that as in most wars. At the end of the war in 1865 the American Navy was superior to any in the world.

DECLINED AFTER CIVIL WAR—SLOW IN REBUILDING.

Again the Navy went stale. There was a revulsion against war and preparation for war. Congress reduced the Navy to such small proportions that there were not enough ships to justify giving commissions to all the graduates of the Naval Academy, small as the number was. It was not until the days of William E. Chandler and William C. Whitney that serious undertakings were commenced to build the "White Squadron," the beginning of the modern navy. And there was little appreciation, even then, of naval needs. The Spanish-American War gave another impetus to naval building, but it hardly survived as a national incentive through two sessions of Congress, though steady if slow progress was made.

It was not until President Wilson threw the weight of his influence in favor of his three-year building program in 1916 that any systematic, continuous, and constructive policy on a large scale was entered upon. Then came the World War with the pressing need of smaller craft to meet the hitherto unknown menace to ships, the American-invented submarine, that stiletto of the sea which became the most destructive agency of maritime warfare the world had ever dreamed. During that war, the Navy by its readiness and efficiency won world confidence and world commendation, and more than half

a million of the flower of our young countrymen came into its service and made possible all that it achieved.

RUSH TO LEAVE SERVICE AS SOON AS WAR ENDED.

Again the history of naval regression threatened to repeat itself, and, indeed, to some degree has recurred. Scarcely had the armistice been signed when the young men who had served so well looked eagerly to return to the pursuits of peace, and only the sense of duty held them in the Navy until the soldiers who had won glory in France could be brought back home in transports manned by the Navy. Then the seamen were released but did not leave the Navy. The large majority remain in the militant Naval Reserve, fit and willing to return if their country again needs them. Not a few officers of the regular service felt the call to duty on shore, and, having performed a great task greatly, were desirous of severing their connection with the Navy. Keen and very able civilians and naval men, who had centered all their thoughts upon improving naval engines of offense, suddenly turned to the study of instruments to increase production in field and factory. There was danger of the Navy going stale in 1919-20, as it had gone stale following every other war.

TWO FLEETS INSURE NEEDED COMPETITION.

Competition is ever and in all callings the basis of progress, of advancement, of perfection. Every effort to find a substitute has failed. This is as true in preparation for defense as in the industrial world. Unless there could be introduced into the Navy the incentive of victory, the stimulus of an inspiring and honorable competition, what assurance was there that the Navy succeeding the World War would be different from what followed all previous wars?

The creation of the Pacific Fleet, equal in material and personnel to the Atlantic Fleet, gives, in addition to its other advantages, the necessary element to guarantee the competition essential to excellence. These two fleets will have generous rivalry. Already in these early days the fleet spirit has been born, it will grow, and in the contests between them will be developed an efficiency which could not have been obtained by mobilizing all the ships in one big fleet all the time in one ocean. The contests which are to be arranged and the frequent coming together will strengthen the spirit of competition and prove the wisdom of securing excellence through competitive contests in gunnery, in target practice, engineering, seamanship, and all branches where war-games and simulated warfare call forth the highest skill and effort.

THE RECEPTION TO THE PACIFIC FLEET.

The reception of the Pacific Fleet by the people of the Western States was unprecedented in enthusiasm and generous welcome. Four reviews were held by the Secretary of the Navy—at San Diego, Los Angeles, San Francisco Harbor, and at Tacoma. The review at Seattle by the President of the United States was the culminating event. The patriotic people, eager to welcome their fleet for whose coming to make its home in their ports they had long waited, came from all the trans-mountain States in such numbers as had not before gathered on the coast. For the first time in American history a mighty Pacific Fleet rode the western waters and when the ships of the fleet let go their anchors in their Pacific home ports, the people of that great section of our mighty Republic felt a sense of protection and recognition which gave them a new thrill of pride and a new feeling of security. The governors of the States were present to open all doors of courtesy; mayors and other officials in State, city, and county vied with each other in literally strewing with roses the path of the men of the fleet when they came ashore to the delightful receptions and entertainments planned for them. The key of every city on the coast was presented and with it the hearts and homes in a gracious hospitality that gladdened the heart of every seaman, from the distinguished commander in chief of the fleet to the youngest recruit making his first cruise on a man-of-war.

PRESIDENT REVIEWED FLEET IN PUGET SOUND.

The greatest occasion of weeks of reception was the arrival of the President of the United States, the Commander in Chief of the Navy, and the review of the fleet by him in Puget Sound, near Seattle. It was a perfect day, the people gathering from all the Northwest to do honor to the President and to the fleet. The historic *Oregon* had been re-commissioned and for the time revived the pride we felt in her in the days of her eventful cruise. It was upon the deck of that ship the reviewing party stood as the fleet sailed through the Golden Gate, and it was fitting that, in the grand review on Puget Sound, the *Oregon* should be the ship upon whose deck the President received the salutes and honors when the dreadnaughts and the flotillas of destroyers thundered their welcome to the head of the Government.

It was not only in these five beautiful harbors, where all the Pacific fleet came together, that there was cordial welcome. At every seaport where the draft permitted their entrance ships of the fleet paid visits to the towns and cities and received the hospitality of the people, all the way from Long Beach to Victoria, and in his flagship

Admiral Rodman was present at Vancouver to present the greetings of the Navy to the Prince of Wales upon the Prince's visit to British Columbia.



ENTHUSIASTICALLY RECEIVED IN HAWAII.

The splendid dreadnaught *New York* visited Hawaii, carrying the Secretary of the Navy, Admiral McKean, Admiral Parks, Commander Hilton, and Commander Foote, who, in addition to visiting all harbors on the Pacific coast, made a trip to those islands to take part in the opening of the new dry dock at Pearl Harbor and to study the needs of that naval base in view of the organization of a large fleet in the Pacific. If the welcome to the fleet had been warm and cordial by the people of the west coast, that given by the Hawaiians was, if possible, even more enthusiastic. It was an event of world interest, the completion and opening of the Pearl Harbor Dry Dock, not only for naval purposes but for commercial advantage as well, for that dock, over a thousand feet long, will insure suitable docking for commercial ships that ply the Pacific as well as for naval vessels. With the enlargement of the facilities at Pearl Harbor naval base, recommended to Congress, that station will be fitted not only to dock but also to repair any ship of any nation crossing the Pacific. The importance of such a navy yard and dry dock at this strategic and commercial center can not be overestimated.

The Hawaiians have long looked forward to the completion of this undertaking, with an interest heightened by the untoward incident which destroyed the plans when the dock, nearing completion, "sunk-up," by an earth upheaval, in the early part of 1913, and caused many to believe it was not possible to construct a large graving dock on that foundation. The completion, flooding, and dedication of the dock to the god of sea power, on the 21st day of August, 1919, was, therefore, of deepest significance to the people of Hawaii and of large value as a stimulus to the increasing commerce by big ships in the Pacific.

BATTLESHIPS' SERVICE IN EUROPE—WORK OF THE FLEET.

When hostilities ended we had nearly four hundred vessels operating in European waters, and these were returned as rapidly as possible. After the surrender of the German fleet at Scapa, at which our battleships serving with the British Grand Fleet, were present, the six battleships, comprising Division 9, Rear Admiral Hugh Rodman commanding, proceeded to Brest, where they met the three battleships of Division 6, Rear Admiral Thomas S. Rogers commanding, which had been operating from the base at Berehaven, and several

divisions of destroyers, all of which, under command of Admiral Sims, took part in the demonstration on the arrival of President Wilson, who went to France on the U. S. S. *George Washington*, escorted by the *Pennsylvania*, flagship of Admiral Henry T. Mayo, commander-in-chief, United States Atlantic Fleet.

WELCOMED HOME BY NAVAL REVIEW.

Immediately after the demonstration at Brest, our battleships hoisted the "homeward-bound" pennant and set sail for the United States. Their return from European service was signalized by a notable naval review, December 26, 1918, for which all available ships of the fleet in home waters were assembled. Arriving off Ambrose Lightship the afternoon of Christmas day, the battleships the next morning steamed into New York, where they were accorded a great demonstration, the review being followed by a land parade of all the returning officers and crews. The Secretary of the Navy, aboard the *Mayflower*, and the Assistant Secretary aboard the *Aztec* had as their guests the Secretary of War and other members of the Cabinet, Senators and Members of Congress, representatives of the diplomatic corps, officers of the Army and Navy, and distinguished civilians who had rendered conspicuous service during the war.

TRIBUTE TO THE RETURNING BATTLESHIPS.

On the eve of the naval review, the Secretary of the Navy issued this tribute to our battleship forces returning from service abroad:

In welcoming home the powerful American dreadnaughts which have been engaged overseas during the war, the American people will greet the officers and men with pride and congratulations. These powerful ships, the equal of any in the world, in cooperation with the British Fleet, gave such predominance of Sea Power in the North Sea that the German Fleet dared not invite suicide by coming out and offering battle. They did not try conclusions because they knew there never was a fleet in being that could have had a chance of victory against the British and American Fleet, working together with the same signals and the same strategy as if they were the naval power of a single nation. Their mission was as single as if they had represented only one instead of the two great English-speaking nations. Their united service typified and cemented the ties between our country and Great Britain. Their silent vigils protected commerce, secured safe passage of troops and supplies, and effectually bottled up the German Fleet, rendering it as impotent for harm as if it had never been constructed.

Sea Power once again demonstrated its primacy in making land victories possible. While the American dreadnaughts, an important part of the world's strongest armada, were not given an opportunity to win a great sea victory, they did more: They cooperated in receiving the surrendered German Fleet, which capitulated to the superior force of the allied fleets, and they will be received at home with all the honors given to valiant victors.

SERVED A YEAR WITH BRITISH GRAND FLEET.

Division 9, composed of the *New York* (flagship), *Texas*, *Nevada*, *Wyoming*, *Arkansas*, and *Florida*, served for a year with the British Grand Fleet, being designated the "Sixth Battle Squadron." The *Delaware* served in this division until July 30, 1918, when it was relieved by the *Arkansas*. Assigned one of the two places of honor and importance in the battle line, this American division did its full share of the Grand Fleet's work, including patrol search for the enemy, protection of convoys, mining, and other forces, and, most important of all, in the repeated attempts to engage the German High Seas Fleet, for which the ships of the Grand Fleet were kept in the highest state of efficiency and readiness. Our battleships were attacked six times by submarines. On one occasion, off the Norwegian coast, four torpedoes were fired at the *Florida* and two at the *Delaware*, and at another time three were fired at the *New York*. Not one of our vessels was hit, and the only damage done was to the *New York*, which while leading the division into Pentland Firth, was rammed by a submerged submarine. Two blades of her propeller were broken off, but officers and crew were convinced that the blows from the propeller sank the U-boat.

Division 6, composed of the *Utah* (flagship), *Nevada*, and *Oklahoma*, was based on Berehaven, Bantry Bay, Ireland, its principal duty being to protect our convoys from possible enemy raiders. This division made two trips into the Channel, escorting convoys when enemy submarines were reported in the vicinity.

ADMIRAL BEATTY'S FAREWELL.

On their departure, Admiral Sir David Beatty, the British commander in chief, in an address on board the flagship *New York*, paid this tribute to the officers and men of the American battleships which served with the Grand Fleet:

I could not let the Sixth Battle Squadron go without coming on board the *New York* and saying something of what I feel at this moment of your departure. I had intended to ask Admiral Rodman to permit me to say something to representatives of all the ships of the Sixth Battle Squadron on board his flagship, but exigencies of the service have not permitted me to do that, and therefore, as Admiral Rodman has said, what I say to you, I hope you will promulgate to your comrades in the other ships, and not only to them but also to your comrades of the Atlantic Fleet.

There is not much that I have to say, but what I do say I hope you will understand comes from the heart, not only my heart, but the hearts of your comrades of the Grand Fleet.

I want, first of all, to thank you, Admiral Rodman, the captains, officers, and ships' companies of the magnificent squadron, for the wonderful cooperation and the loyalty you have given to me and to my admirals; and the assistance that you have given us in every duty you had to undertake. The support

which you have shown is that of true comradeship; and in time of stress, that is worth a very great deal. As somebody said the other day, "The fighting is now over, the talking is now going to begin;" therefore, I do not want to keep you here any longer, but I want to congratulate you for having been present upon a day which is unsurpassed in the naval annals of the world. I know quite well that you, as well as all of your British comrades, were bitterly disappointed at not being able to give effect to that efficiency that you have so well maintained. It was a most disappointing day. It was a pitiful day to see those great ships coming in like sheep being herded by dogs to their fold, without an effort on anybody's part; but it was a day that everybody could be proud of. I have received messages from several people, offering sympathy to the Grand Fleet, and my answer was that we do not want sympathy; we want recognition of the fact that the prestige of the Grand Fleet stood so high that it was sufficient to cause the enemy to surrender without striking a blow. I had always certain misgivings, and when the Sixth Battle Squadron became a part of the Grand Fleet those misgivings were doubly strengthened, and I knew then that they would throw up their hands. Apparently the Sixth Battle Squadron was the straw that broke the camel's back. However, the disappointment that the Grand Fleet was not able to strike their blow for the freedom of the world is counteracted by the fact that it was their prestige alone that brought about this achievement.

During the last 12 months that you have been with us, we have learned to know each other very well; we have learned to respect each other; we know each other's faults (are there any in the Sixth Battle Squadron, Admiral?); we know each other's good qualities, and I want you to take back a message to the Atlantic Fleet that you have left a place, a very warm place in the hearts of the Grand Fleet, which can not be filled until you come back or send another squadron to represent you. You have given us a sample of the Atlantic Fleet which I think will try the Atlantic, efficient as it is, very hard to reproduce. I do not know what Admiral Mayo will say to that, but Admiral Rodman will put it up to him that way.

I understand that you are now going down to Portland, where you are going to get leave—that is so, Admiral, is it not? After that, you have a duty to perform of bringing your President to these waters; and then you will return to your own shores; and I hope in the sunshine, which Admiral Rodman tells me always shines there, you won't forget your "comrades of the mist" and your pleasant associations of the North Sea.

This is a queer place, as you have found out, but you are not the first to find it out. There was a great explorer, Marco Polo, who after traveling over the world for 30 years, one day found himself in the North Sea, and then went home, went to bed, and did not travel any more. I trust it will not have the same effect on any of you. But I can say this for you, that those of you that I have seen during the last 12 months seemed to have improved in many ways, if it was possible; and I think that the North Sea has a health-giving quality which must be put against all the bad points, of which there are so many.

I thank you again and again, for the great part the Sixth Battle Squadron played in bringing about the greatest naval victory in history. I hope you will give this message to your comrades: "Come back soon. Good-bye and good luck!"

DESTROYERS AND PATROL CRAFT RETURNED.

The destroyers, converted yachts, submarine chasers, submarines, and other craft which had been on duty in European waters were

returned to the United States as rapidly as conditions permitted, and a month's leave was given to the personnel before taking up other duties.

UNITED STATES FLEET FORMED—WITH ADDITIONAL FORCES.

On January 8, 1919, the "United States Fleet" was formed, consisting of Battleship Force 1, Battleship Force 2, Cruiser Force, Destroyer Force, Mine Force, and Train. A submarine detachment and an air detachment were added shortly afterwards.

EXTENSIVE EXERCISES HELD AT GUANTANAMO.

Battleship Force 2, the Destroyer Force and Train sailed February 4, for a winter cruise in southern waters, and were joined at Guantanamo by one division of Battleship Force 1 and the Submarine Detachment. The seaplanes of the Air Detachment were flown to Guantanamo, two from Hampton Roads and four from Pensacola. The Cruiser Force and most of Battleship Force 1 were employed in transporting troops from Europe.

UNPARALLELED DEVELOPMENT IN TACTICS.

At Guantanamo extensive tactical exercises and target practice were carried out, and the development of the fleet in tactics during this period was greater than during any other equal period of time in its history. The system of tactics developed during the war was given extensive trials and proved to be most effective.

NEW OPERATIONS SUCCESSFULLY CARRIED OUT.

For the first time in our Navy—

Battleships, destroyers, submarines, and aircraft took part in fleet exercises as component parts of one force.

An adequate number of destroyers were present with the battleships to simulate the operations of a destroyer force in a major action.

Aircraft located a force at sea and furnished information which enabled a division of submarines to simulate a successful attack upon a supposed enemy force.

Airplanes took the air from turrets of battleships at sea.

Submarines operated with battleships over an extended period, taking part in battle exercises each day and steaming continuously between battle exercises.

The new system of signals prepared by the code and signal section, Office of Naval Operations, in cooperation with the commander in

chief, was tested and proved to be more satisfactory than the standard system in use. Great improvements were made in radio communication by the adoption of more efficient procedure and intensive training of operators.

ATLANTIC FLEET GOES SOUTH JANUARY 8.

Extensive overhaul and repair of ships was impracticable during the war and was delayed afterwards because all facilities were required to keep the troop-carrying ships fit. This necessary work has been done during the past few months, and all the dreadnaughts will have finished the necessary repairs and alterations by the close of the year. On the 8th of January Admiral Wilson, commander in chief of the Atlantic Fleet, with 8 of the most powerful dreadnaughts, 56 destroyers, submarines, and auxiliaries will go to Guantanamo for the regular winter maneuvers. They will be followed later by the pre-dreadnaught ships, which will leave Atlantic ports as soon as they can be manned.

EXTENSIVE GUNNERY EXERCISES CONDUCTED.

Last spring the fleet devoted much attention to gunnery exercises, both in Cuban waters and later off the Chesapeake capes.

These consisted of short-range and director practices and torpedo defense practice by the ships which had not carried out these practices, long-range day spotting practice with 12-inch guns, and long-range day individual practices. Spotting from airplanes, seaplanes, and kite balloons was successfully carried out for the first time.

TARGET PRACTICE SHOWED GRATIFYING RESULTS.

Considering the additional conditions imposed, such as extended range, smoke interference, etc., and the fact that many of our ships had, during the war, little opportunity for target practice or thorough training of recruits in gunnery, the results attained were very gratifying.

Experience gained from results of sea battles in the war with Germany, and a critical comparison of our own gunnery with that of our associates in the war, has not indicated the desirability of any change in the principles of gunnery training that were developed prior to the war, expanded to meet war conditions, and continued throughout the war with satisfactory results.

EFFORTS TO INCREASE GUNNERY EFFICIENCY.

Every effort is being made, under the direction of Capt. W. D. Leahy, director of target practice, to train the new personnel and bring the fleet up to the high standard of gunnery efficiency that

prevailed before the war. Some problems in gunnery can not be solved by the use of a towed target, and for future advanced practices at long range under battle conditions, it is proposed that an obsolete battleship be used as a target, the ship, after being set in motion, to proceed under her own steam, with no one aboard. This proposition, which experts believe will enable our gunnery officers to make an important test in the solution of certain problems, is being given consideration.

STANDARDIZED PRACTICE OF FIRE CONTROL.

The latest practice in turret design and operation has been made available to the service in a report of the Fire Control Board, completed last June. This embodies the results of war experience, and provides the service at large, and the bureaus concerned, with a detailed statement of the department's policy as to the standard installation of instruments and the standard practice of fire control.

PLANS TO ESTABLISH A CALIBRATION RANGE.

Plans for the establishment of a permanent calibration range near the mouth of the Potomac River have been prepared. It is intended to use this range for the calibration of vessels' batteries, and for experiments to ascertain the causes of errors in gunfire from guns mounted on ships. Heretofore unsatisfactory temporary ranges in Chesapeake Bay and in Cuban waters have been used for this purpose. The establishment of a permanent range will save expense, expedite the work, and improve results.

STUDYING CAUSE OF ERRORS IN GUNFIRE.

Exhaustive experimental firing to determine the cause of errors in gunfire were conducted with the *New Mexico* in October, 1918. In this firing the Navy Department availed itself of the services of expert physicists, provided by courtesy of the Bureau of Standards, Department of Commerce, who performed highly technical and valuable work in the measurement of certain factors in the ballistic problems investigated.

NAVY BROUGHT HOME 1,686,944 UNITED STATES TROOPS.

With the end of hostilities our work in troop transportation was only half completed. We were faced with the tremendous task of transporting back to this country the 2,000,000 American soldiers in Europe. British and other foreign ships which had carried to France a large portion of our troops were no longer available. The brunt of the burden was borne by the Navy, and its troop-carrying

capacity had to be increased in every way that could be devised in order to bring back the American Army in the shortest possible time.

The energy and efficiency with which this task was performed are evidenced by the fact that by the end of July, 1919, 1,770,484 troops had been returned to America, of which 1,518,149 were brought over in United States transports. The total number returned up to October 1 was 1,945,367, other ships, American and foreign, bringing back 258,423, and vessels manned by the Navy transporting 1,686,944. Of these, all but 12,211 have been returned since the armistice. And this was accomplished without the loss of a single life due to the hazards of the sea, paralleling the record made during war time of transporting hundreds of thousands of American troops without the loss of a man aboard a United States troopship on the way to France. The country may well feel proud of this achievement, and the highest praise is due the officers and crews whose splendid efficiency and devotion to duty produced these results.

CAPACITY OF TROOPSHIPS INCREASED.

In providing for return of troops, the first step taken was to increase the carrying capacity of vessels to the utmost limit consistent with safety and proper sanitation. This was done in all the vessels of the transport force, and following are examples of what was accomplished in providing accommodations for more troops:

Leviathan, increased from 10,000 to 12,000.

America, increased from 4,900 to 7,000.

Agamemnon, increased from 3,300 to 5,600.

George Washington, increased from 3,500 to 6,700.

Orizaba, increased from 3,100 to 3,900.

Siboney, increased from 3,100 to 3,900.

This work was carried on as opportunity offered and without delaying the movements of the vessels concerned. The changes necessary were planned by a joint Army and Navy board, and carried out under the direct supervision of the staff of the Cruiser and Transport Force. These involved the installation of "standees"; increase of ventilation, toilet and galley facilities, and life-saving equipment. The greater capacity resulted in a very material saving in time and expense. Troops were necessarily crowded and deck space for airing and exercising limited, but in no case was this carried to the extent to justify serious complaint.

BATTLESHIPS AND CRUISERS CARRIED TROOPS.

To assist in carrying out the broad policy of the Government to use every American vessel available for repatriating troops, in December the battleships of Battleship Force No. 1 (15 vessels)

and the cruisers (10 vessels), were assigned to the transportation of troops. The battleships were fitted out to carry an average of 1,100 troops and the armored cruisers about 1,750. The former were operated on a 40-day, and the cruisers on a 30-day schedule. These vessels continued in operation until the fleet was reorganized and there was no longer any urgent necessity for their use.

WARSHIPS USED TO TRANSPORT TROOPS.

The battleships and cruisers employed in troop transportation brought back more than 145,000 men, as follows:

Battleships.—*Connecticut*, 4,861; *Georgia*, 5,869; *Kansas*, 7,486; *Louisiana*, 4,714; *Michigan*, 1,052; *Minnesota*, 3,955; *Missouri*, 3,278; *Nebraska*, 4,530; *New Hampshire*, 4,900; *New Jersey*, 4,675; *Ohio*, 778; *Rhode Island*, 5,303; *South Carolina*, 4,501; *Vermont*, 4,795; *Virginia*, 5,784; total, 78,788.

Cruisers.—*Charleston*, 7,704; *Frederick*, 9,659; *Huntington*, 11,913; *Montana*, 8,800; *North Carolina*, 8,962; *Pueblo*, 10,136; *Rochester*, 317; *Seattle*, 9,397; *South Dakota*, 3,463; *St. Louis*, 8,437; total, 66,481.

EMERGENCY CALLED FOR EXTRAORDINARY MEASURES.

The utilization of fighting ships as transports was a new employment for them, but the soldiers and the people at home were anxious for quick return of the troops abroad, and it was the plain duty of naval administration to hasten their return in every way possible. Upon the signing of the armistice there was a fear that amounted to a dread that it would require two years for American ships to bring back American soldiers. The emergency clearly called for extraordinary measures. These fighting ships were not built to act as transports and were not fitted for such service. There were able naval officers who thought such use was not to be considered, much less carried out. To be sure they were right in saying it was not a naval function and that it would interfere with the training of men and the temporary efficiency of the ships for battle. They feared also that the troops might be uncomfortable and object to this character of transportation across the Atlantic.

NAVAL OFFICERS GLAD TO AID FELLOW SERVICE.

The immediate duty, however, which the Navy felt imperatively called upon to perform was to bring back the troops as quickly as they were carried over. This was possible only by making ocean ferryboats out of battleships of the class built before the dreadnaughts and armored cruisers. With reduced crews these ships were enabled to transport thousands of American soldiers, and the officers of these ships and the department received thanks from the men of the sister service, who were glad to add to their experience the

pleasure of coming home on battleships. It was a distinct service, rendered at a time when transportation from Europe was limited and needed immediately above everything else. In this, as in a score of other ways that were removed from its ordinary functions, the Navy proved that it was as versatile in the character of its usefulness as it was fit and ready in the special naval duties which devolved upon it.

To have been able, in addition to manning transports, to have placed fighting ships at the convenience of the men of the Army was a pleasure. That it was appreciated by the Secretary of War and the officers and thousands of men who were thereby enabled to come home earlier than otherwise is compensation enough for the new departure. In war, and in peace as well, the organization that is not flexible enough to render every service of which it is capable fails to measure up to its high duty.

FIFTY-SIX CARGO VESSELS CONVERTED INTO TRANSPORTS.

Fifty-six vessels, mostly of the cargo type, were taken over and converted by the Army, under Army contract and supervision, for the transportation of troops. These were not particularly well fitted for this duty and naturally it was the desire, in order to keep down the cost, to make as few changes as possible in their structural arrangements. The officer-carrying capacity of these vessels was very small, but by carrying some officers in standees it was possible to transport sufficient officers with the troops to maintain the necessary discipline.

Soon after these vessels were taken over by the Army, they were commissioned in the Navy and assigned to the transport force. During the period of conversion close liaison was maintained between the Army and the Navy in the work of fitting out and inspecting these vessels in order that they might be suitable for use as transports. A special office was organized to which were attached several naval officers of transport experience to maintain the necessary liaison with the Army, and the two services worked in cordial co-operation.

The majority of the officers on these vessels were enrolled in the Naval Reserve and continued in their same positions when the ships were commissioned. On a few of the larger vessels it was considered advisable to place regular officers in command until the reserve officers had been indoctrinated with the methods of the Navy and the transport force. These reserve officers quickly absorbed the spirit of the Navy and realized the mission they had to accomplish, and they deserve high praise for their excellent work and devotion to duty.

NINE BIG GERMAN SHIPS EMPLOYED.

Following the armistice, an interallied commission took over from Germany certain German passenger vessels which were in the ports of Germany during the war. Nine of these large vessels, the *Imperator*, *Kaiserin Augusta Victoria*, *Prinz Friedrich Wilhelm*, *Zeppelin*, *Cap Finisterre*, *Graf Waldersee*, *Patricia*, *Pretoria*, and *Mobile*, were transferred to the Government of the United States and assigned for conversion and operation as troopships. These ships were taken over in French or English ports from the Germans, were manned by naval officers and crews who had been on duty at the various bases abroad, and delivered to American ports for conversion. The first to arrive at New York was the *Kaiserin Augusta Victoria* on April 19, 1919, and the others followed at short intervals. The terms under which they were used prohibited any extensive structural changes in the vessels, so that their conversion consisted in installing standees in cargo and other available spaces; necessary ventilation, galley facilities, the provision of hospital and other accommodations.

"IMPERATOR" FITTED OUT IN TEN DAYS.

The conversion of these vessels was done at the navy yards and by private contractors. The naval personnel concerned was determined to make a record in preparing these ships for service, and a vast amount of work was accomplished in a remarkably short time. These vessels were converted in an average of less than 14 days—the giant *Imperator* was in 10 days fitted out to carry 9,000 troops and 1,400 first-class passengers—and the cost per troop was about \$40 for material, labor, and overhead charged. The cost-plus system for all work done showed a marked advantage over the system that was required in converting the cargo vessels, of drawing up specifications and letting the contract for a lump sum to the lowest bidder. The average time in port of the cargo vessels under conversion was 75 days, and the cost per troop was about \$78. The cost-plus system, which had been used in the conversion, repair, and maintenance of the transport force during the war, had demonstrated its marked superiority over any other system for rapid work and economy in the emergency. The nine German vessels employed were converted to a total carrying capacity of 3,997 officers and 39,132 men.

MADE NEW RECORDS IN QUICK TURN-AROUNDS.

The personnel of the Transport Force were indoctrinated with the necessity of making the quickest possible turn-around in order to bring back the maximum number of troops in the shortest time. A maximum lay-over of three days in a foreign port and seven days in

a home port was set, but vessels quickly began to reduce this time, and competition became keen to arrive in port, unload, load, repair, and get to sea again as quickly as possible. Little opportunity was given the officers and crews for liberty on shore, either abroad or at home, but they accepted this condition uncomplainingly.

340,946 BROUGHT BACK IN ONE MONTH.

After January 1, 1919, troop movements gradually increased and the number carried grew from month to month until the maximum was reached in June, when 340,946 men embarked from France, 314,167 of them in United States transports. This exceeded the maximum carried overseas by all American and allied vessels in any one month during the war. When the troop movement reached its highest point, the average cycle of troop transports was 25 days, and of the converted cargo vessels about 35 days. For certain 10-day periods, the average cycle of the former reached the low level of 21 days, and the latter 29 days. It was anticipated that the troop transports would require approximately a 30-day cycle, and the ex-cargo vessels a 40-day cycle, but the rapidity of loading troops in France, and of repair, provisioning and coaling, made it possible to reduce materially the estimated time.

142 VESSELS USED IN TROOP TRANSPORTATION.

The maximum number of vessels assigned to and operated by the Navy for the transportation of troops was 142, with facilities for carrying 13,914 officers, and 349,770 men.

TRANSPORTED MORE THAN 2,500,000.

When it is recalled that 911,047 men were carried to Europe in United States Navy transports before hostilities ended, November 11, 1918, it will be seen that the total number the Navy transported was more than two and one-half millions. The latest available figures are 2,597,991. More than 150,000 sick and wounded were returned on our transports and hospital ships under care of Navy surgeons and hospital corpsmen. Of the 2,079,880 men of the American Expeditionary Force taken to France previous to the armistice, the numbers and percentages of the total carried in the various classes of vessels were:

	Number.	Percentage.
United States Navy transports.....	911,047	43.75
Other United States ships.....	41,534	2.50
British ships.....	1,006,987	48.25
British-leased Italian ships.....	68,246	3.00
Other foreign ships, French, Italian, etc.....	52,066	2.50

As is shown by the above table, 952,581 were carried in American vessels—46.25 per cent of the total transported.

EFFICIENCY OF FORCE STEADILY INCREASED.

Organized in June, 1917, with the few hastily assembled cruisers and transports that formed the first troop convoy sent to France, the Cruiser and Transport Force grew rapidly and its efficiency steadily improved as experience was gained. When it became evident that a large American Army must be put into the field in France early in 1918 if the war was to be won, every effort was put forth to increase the troop-carrying capacity of vessels to the maximum. This was done during the time of layover in American ports and without delaying sailings.

Additional destroyers having been sent to Europe for escort duty, it became possible to sail medium speed (13 to 14 knots) troop convoys from New York at seven-day intervals and fast troop convoys (15½ knots and above) at five-day intervals. With reduction in turn-arounds, this meant ability to carry many more men in a given time.

SUBMARINE RAIDS NECESSITATED MORE ESCORT.

From the beginning of the fiscal year, July 1, 1918, Squadron 1, Cruiser Force, was engaged in escorting troop transports and the fast merchant convoys from New York. Squadron 2 continued escorting medium-speed merchant convoys out of New York and Newport News at regular eight-day periods.

With the beginning of enemy submarine operations on this coast in the summer of 1918, the previous exacting duties of the cruisers were increased by the necessity of escorting transports from Newport News until they joined up at the rendezvous with the New York section of the group. This required cruisers to be held at Hampton Roads for the escort of the Newport News section of the group. When these two sections formed their junction at sea, the cruisers that had escorted the Newport News section proceeded to New York for liberty and overhaul.

BATTLESHIPS SERVED AS RAIDER GUARDS.

Reports having been received of expected raids by enemy battle cruisers, the battleships of Squadron 2, battleship force, were assigned to escort duty as raider guards. The *South Carolina* sailed on September 9, 1918, as the escort for British convoy No. 48, and the battleships of this squadron continued to escort the troop and fast merchant convoys until the danger of raiders was considered over. The utmost protection, by cruiser and destroyer escort and

every other possible means, was given troopships during the entire period of hostilities, and discontinued only when there was no longer any danger of attacks or enemy activity.

In the six weeks after the armistice advantage was taken of this period of reduced activity to give certain vessels, including the *Leviathan*, *Agamemnon*, *Great Northern*, *Kroonland*, *Harrisburg*, *Von Steuben*, and *Aeolus*, extended overhaul, of which they were much in need. With the beginning of the present year troop transportation increased rapidly until July, by which time most of the American Army had returned. As the need for their use ceased, vessels employed as transports were returned to the Army, Shipping Board, and private owners and the transport force reduced. On September 1, 1919, Admiral Albert Gleaves, who had been in command from the formation of the force, was detached to command the Asiatic Station, and was succeeded by Rear Admiral C. B. Morgan.

CRUISER AND TRANSPORT FORCE LOST ONLY FIVE VESSELS.

During the entire period of its operations, the Cruiser and Transport Force lost only five of its vessels—the transports *Antilles*, *President Lincoln*, and *Covington*, sunk by submarines while returning from France; the cruiser *San Diego*, sunk by a mine near Fire Island, off the coast of New York, and the transport *Tenadores*, stranded in French waters in a storm December 28, 1918. The *Finland* and the *Mount Vernon* were torpedoed near the French coast while homeward bound, but reached port and were repaired. The *Northern Pacific* ran aground on Fire Island January 1, 1919, but the troops she carried were taken off without loss and the steamer later was floated, taken to port, repaired, and put back into service.

When we take into consideration the conditions under which its work was performed, the constant menace during hostilities of submarine attack, and the perils of navigation, we can truly say that this force made a record that has never been excelled.

NAVY OPERATED VAST FLEET OF CARGO SHIPS.

The Naval Overseas Transportation Service, established in January, 1918, to transport supplies for our military and naval forces overseas, grew into the largest service of the kind in existence, comprising 490 cargo vessels of 3,800,000 dead-weight tonnage, more than the combined fleets of the largest trans-Atlantic lines before the war. Of this number 378 vessels (2,900,000 dead-weight tons) were in actual operation by December, 1918, the remainder being in course of construction, or being prepared for commissioning. The growth of "N. O. T. S.," as it was popularly termed, was remarkably rapid. Created when the Navy was called upon to man many vessels of the

Shipping Board and Army for which crews could not be provided from the merchant marine, it grew in half a year to 198 vessels, which number was nearly doubled in the succeeding six months. Six million tons of cargo, in round figures, were transported, including all kinds of supplies and munitions for our own forces and those of our allies; commercial cargoes needed at points where tonnage was unavailable or insufficient, and substantial aid given to the Food Administration in carrying provisions to distressed regions of Europe where relief was urgently needed.

FORCE OF 4,672 OFFICERS AND 29,175 MEN.

A force of 4,672 officers and 29,175 men was required to man and operate this immense fleet, and a large organization, with port headquarters at New York, Baltimore, and Newport News, had to be built up to supervise its operation. The crews, composed largely of Naval Reserves, proved notably efficient. Armed with naval guns, equipped for defense, these vessels sailed for France in convoys, braving the dangers of the war zone, and in numerous encounters with submarines, officers and men proved their vigilance and courage, exemplifying the best traditions of the Navy.

VESSELS RAPIDLY RETURNED TO OWNERS.

Demobilization was begun immediately after the armistice, vessels being turned over to the Army, the Shipping Board, or private owners. As their need in war service ceased, the ships were demobilized as rapidly as they could be surveyed and merchant crews obtained. By July 1, 1919, only 100 remained, and practically all these have since been returned.

During the period of demobilization the vessels remaining in service were engaged in carrying supplies for the Army and Navy to and from Europe, in carrying cargoes of food to Europe for the Food Relief Commission, and certain vessels operating for the account of the Shipping Board carried to various ports of the world commercial cargoes that were urgently needed. Many of the larger vessels were converted into troop transports and utilized in bringing troops from France.

FIRST TO FLY ACROSS THE ATLANTIC.

That dream of aviators, flight across the Atlantic, has at last been achieved, a United States Navy seaplane being the first craft to make the voyage through the air from America to Europe. On May 26, 1919, a huge flying boat swung into view of thousands of watchers who lined the shore at Lisbon, Portugal, and, circling over the harbor, descended to its mooring. It was the NC-4, Lieut. Commander

Albert C. Read commanding, and its arrival there marked the accomplishment of the first trans-Atlantic flight. Royally received by the Portuguese authorities and people, the NC-4, after three days in Lisbon, left for England, arriving May 31 at Plymouth, the port from which the Pilgrims sailed for America 300 years ago. Completing the voyage of 4,500 miles, Lieut. Commander Read and his crew were given a welcome worthy of pioneers who had led the way in trans-ocean navigation of the air.

While to the aviators who manned the flying boats this flight was "life's great adventure," the Navy had planned it not as a feat of dash and daring, but as a scientific undertaking to demonstrate the possibilities of aerial navigation and work out in practice the untried problems of overseas aviation.

HUGE SEAPLANES PLANNED IN 1917.

As long ago as September, 1917, Rear Admiral David W. Taylor, Chief of the Bureau of Construction and Repair, ordered that designs be prepared for a flying boat large and powerful enough to fly across the ocean under its own power; capable of going far out to sea on patrol duty, or of bombing distant enemy bases and returning without refueling or descent. In designing such a seaplane, far larger than any then in existence, many difficulties were encountered, but these were, one by one, overcome. The perfection of the Liberty motor furnished the large motive power required, making possible a lifting capacity of 25,000 pounds. With the cooperation of the Bureau of Steam Engineering, in October, active work was begun on the plans, which were completed in January, 1918, and contracts were made for the building of four of these planes. The first was completed in September, 1918, and a test flight made on October 4. Though, on the whole, the machine performed satisfactorily, several changes were found desirable. These were made, and thorough tests, under all conditions, were conducted, the plane meeting them successfully. In December the NC-1 carried up 51 passengers in a flight at Rockaway, N. Y. With the completion of the other three boats contracted for, the Navy was prepared, as early in the spring as weather conditions were favorable, to undertake the flight across the Atlantic.

SEAPLANE DIVISION ORGANIZED IN FEBRUARY.

Orders were issued in February for the organization of NC Seaplane Division 1, to which experienced aviation officers and men were assigned, and active preparations begun. Special navigational and meteorological instruments, several of them invented or adapted by Navy experts, were perfected, and used for the first time on this flight.

Every precaution was taken to insure the success of the undertaking. Battleships and destroyers were stationed at intervals of about 75 miles along the entire route to take meteorological observations and report weather conditions. The United States Weather Service gave hearty cooperation, not only in frequent reports, but also in equipping ships with instruments.

CREWS WERE READY—GUARD-SHIPS AT STATIONS.

The naval air station, Rockaway, N. Y., was chosen as the base and three of the four planes constructed were prepared for the flight. By the beginning of May they were in condition, only awaiting propitious weather to start on the long journey. Commander John H. Towers was placed in command of Seaplane Division No. 1, with the *NC-3* as his flagship; Lieut. Commander Albert C. Read was given command of the *NC-4*; Lieut. Commander Patrick N. L. Bellinger, of the *NC-1*. The route selected was: From Rockaway to Halifax, Nova Scotia; Halifax to Trepassey Bay, Newfoundland; Trepassey to the Azores; Ponta Delgada to Lisbon, Portugal; Lisbon to Plymouth, England. The actual trans-Atlantic crossing was from Trepassey to Lisbon, but it was decided to fly the boats from New York to Trepassey rather than ship them, as it was believed that the lessons learned in this 1,150-mile preliminary flight would be of great value in the trip to Europe.

Prior to the start of the flight the destroyers left port and took their positions along the route, to act as guide posts, furnish weather reports and communication by radio, and render any assistance needed.

FLEW FROM ROCKAWAY, VIA HALIFAX, TO TREPASSEY.

On the morning of May 8, 1919, the three giant planes took the water at Rockaway Naval Air Station, the flagship, *NC-3*, leading off at 9.59 o'clock, and the other two following at intervals of a minute. After "taxiing" through the water a few moments, all three planes swung into the air for the long journey. The *NC-3* and *NC-1* proceeded without difficulty to Halifax, arriving there before dark. Off the Massachusetts coast the *NC-4* developed trouble in oil feed. Descending about 80 miles east of Cape Cod, she remained on the water all night, taxiing under her own power to the naval air station at Chatham, Mass., where she arrived early the next morning. The *NC-1* and *NC-3*, after two days at Halifax, proceeded to Trepassey, where the machines were given their final tests and tuned up for the Atlantic voyage. Bad weather caused several days' delay and in the meantime the *NC-4*, having completed repairs, left Chatham on May 14 for Halifax and proceeded the next day to Trepassey.

ON THE LONG "JUMP" TO THE AZORES.

It was the evening of May 16, a few minutes after 6 o'clock, when the three planes, carrying every ounce of weight their four powerful engines could lift, swung out into the waters of the bay and taxied off for the start. Nosing up as the speed neared the flying point, leaving a white foam in their wake, the trio quickly took the air and began to climb. With the flagship, *NC-3*, in the van, followed closely by the *NC-4* and *NC-1*, the planes headed for the southeast on the long "jump" to the Azores.

Sailing along through the air, sometimes in sight of each other, but for the most part alone in a boundless expanse of sea and sky, each plane navigated independently. Now and then a destroyer, a tiny spot on the spreading ocean below, would be sighted, located at first by the smoke columns that poured from her funnels and, as night came on, by searchlights or star shells, some of which were seen 50 miles away. Thus the aerial navigators were able to check their calculations and determine whether they were keeping to their course.

RAN INTO THICK FOG NEAR AZORES.

All through the night, running not far apart, the three planes winged their way over the sea, the station ships below whisking by, one by one. Just when the flyers began to feel that the goal was within their grasp and they could safely negotiate the 1,380-mile flight, the dread foe of navigators appeared. Fog, so dense that it all but blinded the pilots and so widespread that it was almost impossible to sail under or surmount, was encountered. Now all the skill of the aviators, tense with the strain of long hours of continuous flying, was called into play, for not only was the success of the flight at stake, but life itself in the balance.

"NC-4" REACHES HORTA—TWO OTHERS DESCEND.

The *NC-4* managed to ascend above the fog, and 15 hours and 13 minutes after leaving Newfoundland arrived at Horta, the emergency stop in the Azores. Fifteen minutes before, the *NC-1* was forced to descend to the water at a point 45 miles on the other side of the island of Flores, and about half an hour later the *NC-3* also descended at a point about 35 miles from the island of Fayal.

ATTEMPTS TO TOW DISABLED "NC-1" FAILED.

Soon disabled by the heavy seas, the *NC-1* was sighted, after five hours on the water, by the steamer *Ionia*, and Lieut. Commander Bellinger and the other members of the crew were taken aboard and landed safely at Horta. Pounded by heavy seas, the *NC-1* was

badly damaged, and the crew worked desperately to keep it afloat until help arrived. Repeated attempts to tow the plane failed. Destroyers went to her assistance, but she sank while they were trying to get her to port.

"NC-3," ON THE WATER THREE DAYS, TAXIED TO PORT.

When the *NC-3*, caught in the fog, descended to the water, she encountered heavy seas. Rain squalls occurred during the night and the next morning she had to face a gale. Destroyers were searching for her, but her radio apparatus failed, and she could not flash them her location. After tossing on the ocean for a day and night, the morning of May 18 her port wing pontoon was suddenly carried away, and men had to be placed on the starboard wing tip to keep the port wing clear of the water. The high seas soon afterwards began to break the ribs of the lower plane and split the fabric. A steep wave lifted the bow and forced under the water the lower elevator, which began to disintegrate and was finally swept off. The cables of the sea anchors parted. The hull was leaking badly, and the pumps had to be kept going.

The sun came out and the top of Mount Pico was sighted, showing that land was only 35 miles away. But the 60-mile wind and heavy seas made hopeless any attempt to reach Pico, and it was decided to endeavor to work toward San Miguel. Taking advantage of every lull in the waves and making a course slightly across the wind, by the use of ailerons and rudder, some progress was made, increasing as the pilots gained experience in this untried navigation. The heavy wind and seas continued throughout the night, and by daylight practically nothing was left of the lower wings except the beams, heavy wings between struts and the starboard wing pontoon.

TAXIED TO PORT UNDER HER OWN POWER.

Early in the morning San Miguel was sighted, and the course was changed toward Ponta Delgada. When 7 miles off the harbor the plane was sighted from shore and thirteen minutes later the destroyer *Harding* came into sight, standing out at full speed. Her offer of assistance was refused, the *NC-3* proceeding under her own power. A few minutes later a cross-sea swept off the starboard pontoon, which, dragging in the water, almost capsized the seaplane. But by keeping men ready to run out on the wings and using the three available engines, the *NC-3* taxied to her mooring, reaching Ponta Delgada at 4.50 p. m., having been on the water for 53 hours, drifting and taxiing 209 miles in the endeavor to reach port. Officers and crew had suffered hunger as well as other hardships, for their sandwiches had fallen in the bilge when the plane descended, and the

crew subsisted almost entirely upon a few cakes of chocolate, as the emergency rations created extreme thirst, and the radiator water, all they had left to drink, was very unpalatable. But the aviators were in good spirits, in spite of their distressing experiences.

REJOICING AT PONTA DELGADA WHEN AVIATORS ARRIVED.

Ships in the harbor were dressed, the town of Ponta Delgada decked in flags, and there was general rejoicing at the arrival of the lost aviators. A salute of 21 guns was fired by the Portugese battery. Taken to Admiral Jackson's headquarters, Commander Towers and his crew were officially welcomed by the Governor of the Azores and the Mayor of Ponta Delgada.

PONTA DELGADA TO LISBON IN 9 HOURS 43 MINUTES.

Delayed at Horta three days by bad weather, the *NC-4* on May 20 flew to Ponta Delgada. There she remained nearly a week, waiting for favorable weather conditions. Early in the morning of May 26 she departed for the 891-mile flight to Lisbon, arriving there safely before dark. Two heavy rain squalls were encountered, but the plane proceeded steadily, making the run in 9 hours 43 minutes.

LISBON GAVE "NC-4" A ROYAL WELCOME.

Lisbon turned out en masse to receive the aerial voyagers, the thousands lining the water front cheered as the seaplane hove in sight, bells rang, whistles blew, and the guns of the shore batteries boomed to welcome the *NC-4*. Lieut. Commander Read and his crew were paid every honor by officials and citizens, and decorations were conferred upon them.

Remaining at the Portuguese capital three days, the *NC-4* departed on May 30 for England, on the last leg of the flight. Circling over the city, the plane stood out for Cape Roca. Dodging several small squalls and encountering rain, a leak developed in the port engine, and the plane headed toward land, hunting for smooth water in which to descend. She landed in the Mondego River, near Figuera, and soon completed repairs, but the sand bars prevented getting away until high tide, and in the afternoon she flew to Ferrol, Spain, where she remained for the night.

VOYAGE ENDED IN PORT FROM WHICH PILGRIMS SAILED.

The next morning, May 31, she departed for England, flying across the Bay of Biscay, circling over Brest, and, in spite of thick weather, proceeding swiftly reached Plymouth at 2.26 p. m. The long flight of 4,500 miles across the Atlantic and up the European coast was

ended at the port from which the *Mayflower* had sailed three centuries before. Received with the utmost enthusiasm, the aviators proceeded to London, where they were paid high honors, and presented to the King, the Premier, and other officials, who tendered their hearty congratulations. They also proceeded to Paris, where they were entertained by French officials and officers of our own and other navies.

The reports of the commanders of the NC planes, which are of present and historic interest, are printed as Appendix G of this report.

BRITISH AVIATORS MAKE FIRST NONSTOP FLIGHT ACROSS OCEAN.

The world was still ringing with the achievement of the *NC-4* and the daring exploit of Harry B. Hawker, the Australian who attempted to fly from Newfoundland direct to England in a light, speedy land plane, when it was again thrilled by the news that Capt. John Alcock and Lieut. Arthur W. Brown, in a big British bombing plane, had flown from Newfoundland to Ireland in 16 hours, making the first nonstop flight across the Atlantic.

HUGE AIRSHIP CROSSES ATLANTIC AND RETURNS.

Six weeks later, in July, the huge British rigid dirigible *R-34*, Maj. G. H. Scott commanding, made the voyage from England to America and return, the first round trip across the Atlantic. Arriving at Mineola, N. Y., July 6, after a voyage of 108 hours 12 minutes, she remained until midnight July 9, making the return voyage in much quicker time. One of our own naval officers, Lieut. Commander Zachary Landsdowne, by invitation accompanied the crew of the *R-34* on her trip to America. This airship, as large as an ocean liner, 643 feet long, with an over-all height of 92½ feet and of 2,000,000 cubic feet capacity, created great interest among our own aviators, and her voyage demonstrated the possibilities of dirigible balloons in transocean navigation.

AIRSHIP OF LARGEST TYPE PURCHASED BY THE NAVY.

The importance of bringing our own lighter-than-air craft up to the high state of development reached in England and Germany is thoroughly realized by all who are interested in aeronautics, and we are making every effort to that end. None of the modern rigid-type airships having been built in this country, we have succeeded in purchasing from the British Government one of the largest type, similar to, but larger than the *R-34*, which will soon be brought to America.

The same legislation which authorized the purchase of this airship abroad also made appropriation for the construction in this country of an airship of the largest type, which will be built as rapidly as possible.

BUILDING HUGE HANGAR AT LAKEHURST, N. J.

To accommodate this airship and others to be built, we are erecting at Lakehurst, N. J., a hangar of unprecedented size, for both construction and storage purposes. Plans and specifications were prepared and contracts awarded by September 8 for a building 804 feet long, 318 feet wide, and 200 feet high, with a frame of structural steel built on the three-hinged arch truss principle, each arch supported on steel towers 62 feet high.

The entrance door is double, consisting of two leaves, each 177 feet high and 136 feet wide, framed in structural steel and braced to a thickness of 76 feet at the bottom. Special railway track is provided as a runway for these immense portals. When fully opened, their upper contour forms an unbroken arch outline with the roof of the building, and the whole arrangement provides a windbreak nearly 600 feet wide, insuring a large degree of safety in landing and releasing the ships. The magnitude of these doors can be better grasped when it is stated that a 12-story building with a frontage of 135 feet could be placed within the hangar through the space covered by either leaf, with clearance to spare all around.

WILL ACCOMMODATE AIRSHIPS LARGER THAN ANY NOW BUILT.

The body of the structure will accommodate two dirigibles of 5,000,000 cubic feet capacity, each more than twice as large as the celebrated *R-34*, or one dirigible of 10,000,000 cubic feet capacity. Overhead trolleys are provided for the construction of airships, and three docking rails of special design for landing, releasing, and mooring purposes extend throughout the length of the building and for 1,500 feet in front. The two standard-gauge railway tracks occupy similar spaces. The hangar is expected to be in service by next summer.

HELIUM PRODUCTION PLANT ERECTED IN TEXAS.

A large helium plant has been erected at Fort Worth, Tex., and this is of vital importance in lighter-than-air craft, as the exploitation of helium as a flotation agent for dirigible balloons has been a most interesting war development. This gas, formerly very rare and expensive, is nearly as buoyant as hydrogen and less combustible than asbestos. It is the one unique balloon-filler known. Fortunately, it exists in workable quantities in the natural gases of north Texas.

The helium plant is, as the name suggests, for the production of helium commercially. The work will cost, when completed, approximately \$5,000,000. The plant takes the natural gas, from

which helium is extracted, through a pipe line 96 miles in length. The production of 40,000 to 45,000 cubic feet per day is contemplated.

This output is to be distributed to the various air stations in steel cylinders, each having a capacity of 180 cubic feet of free gas. Such a capacity is thought to be sufficient to furnish supplies of helium to our entire dirigible fleet as needed. A study is now being made of an additional stage in the refining plant to repurify used helium after diffusion has occurred in use, which should result in a very desirable economy.

NAVY "BLIMPS" MAKE NEW WORLD RECORDS.

While we have constructed no airships of a size comparable to the *R-34*, we have succeeded in the highest development of the nonrigid dirigibles, popularly called "Blimps," which during the past year have made new world records in both endurance and distance flights. Had it not been for the unfortunate accident which resulted in the loss of the *C-5*, we might have won the honor of the first crossing of the Atlantic by lighter-than-air craft.

"C-5" MADE FLIGHT FROM MONTAUK TO ST. JOHN'S.

While the NC planes were at Trepassey last May, the dirigible *C-5* Lieut. Commander Emory W. Coil commanding, established a world's record for a nonstop flight for airships of the nonrigid class, flying from the naval air station, Montauk, Long Island, to St. John's, Newfoundland, a distance of 1,050 nautical miles, in 25 hours and 50 minutes. Soon after she arrived a heavy gale sprang up suddenly, and, despite all efforts made to hold her or deflate the bag, the big balloon was torn from its moorings and swept out to sea. Destroyers and other vessels searched the area for days, but no trace of the missing dirigible was found. The trip to St. John's and previous tests indicated that the *C-5* could successfully have negotiated the trans-Atlantic voyage.

"F-5" FLYING BOAT IN AIR 20 HOURS 10 MINUTES.

On April 25, 1919, a twin-motored flying boat of the *F-5* type, fitted with two direct-drive, high-compression Liberty engines, made a nonstop flight of 20 hours and 10 minutes, during which a distance of 1,250 nautical miles was covered. This boat carried a crew of four men, and the total weight was approximately 16,200 pounds.

RADIO TRANSMITTED BY SEAPLANE 1,400 MILES.

Radio transmission in aircraft was greatly improved during the period of hostilities. On the trans-Atlantic flight two-way com-

munication was maintained with a shore station over a distance of 700 miles. One seaplane was heard at the Bar Harbor, Me., receiving station from a distance of 1,400 miles.

Telephoning by wireless to and from aeroplanes has been successfully accomplished, in some instances at a distance of 150 miles. It is now easily practicable to telephone from land to seaplanes in flight a considerable distance from shore.

NEW NAVIGATIONAL INSTRUMENTS AND METHODS.

A number of the new navigational instruments, recently invented or developed, were used for the first time in the trans-Atlantic flight. These include an aerial sextant, by means of which the aviator can calculate his position by sun or star observation; a drift and speed indicator by which, sighting on flame and smoke bombs dropped into the water, the velocity and direction of the wind may be determined; and a course-and-distance indicator.

New methods have also been devised by which the navigator can make his astronomical calculations in a fifth of the time formerly required. For this purpose a zenithal projection chart of the Atlantic was constructed, making unnecessary difficult mathematical calculations, and enabling the aviator to determine his position in a few minutes.

PROVIDES SWIFT MEANS OF TRANSPORTATION.

The trans-Atlantic flights, in which British and American aviators vied with each other in glorious achievement; the flight from New York to San Francisco and return by Lieut. Belvin W. Maynard and other Army aviators; the notable advance in aircraft of all types; the acquisition, through war experience, of thousands of trained aviators; the operation of mail and passenger planes—all these point to a development that will make aeronautics a means of swift transportation, bringing continents closer together and reducing the trans-ocean voyage to hours instead of days.

NAVAL AVIATION AN INTEGRAL PART OF THE SERVICE.

This emphasizes the necessity of developing aviation as an integral part of our military and naval forces. When an airship can fly from Europe to America in a few hours, the ocean is no longer a dependable protection against possible attack. Civilian aviation should be given every possible encouragement, but naval aviation, to be effective, must be moulded into the naval service, of which it is a vital part. For this, special training is required, not only in methods of fighting and patrol, but also in naval training to insure that complete understanding between all parts of the force employed, that mutual knowledge which is a prime requisite in all military operations. Our aviation

force must be made a part of the fleet as well as an effective coast patrol—capable not only of operating from shore, but also at sea, accompanying our ships wherever they may go.

BATTLESHIPS SUPPLIED WITH PLANES.

Planes are being supplied to certain battleships, and it is the intention to equip other classes of vessels, capable of employing them, with flying machines. Our kite balloons, dirigibles, and big rigid airships will be as much a part of the fleet as its battleships, essential to its operations and vital to its effectiveness in battle. They will be the eyes and wings of the fleet. By use of tenders and vessels designed to carry planes, we can create an aviation service that may accompany the fleet and operate with it in any quarter of the globe.

FACILITIES REQUIRED AT FLEET BASES.

While some large coastal stations are essential, it is not necessary to maintain, in time of peace, any considerable number of them; but facilities for aviation activities are essential at all important fleet bases. These are especially needed on the Pacific Coast, where few at present exist. Means for the use of aircraft as an auxiliary to the Marine Corps should also be provided near the bases which the Marines maintain for their expeditionary units.

Encouragement should be given to the establishment of flying fields near cities, and these, with aircraft, should be made available for members of the Naval Reserve Flying Corps. It is to these reserves and civilian aviators we must look for recruits, in case of war, to augment our flying corps, which can readily absorb them if kept at a high state of efficiency in the service.

OBJECTIONS TO CREATING SEPARATE AIR SERVICE.

Favoring every encouragement that can be given to aviation in all phases of development and activity, I am convinced that the creation of a united air service, as a separate department of the Government, is unwise. Certainly the Navy, and I believe the Army, considers it essential to military effectiveness to retain its own aviation corps and stations. Military aviation, which has for its purpose fighting effectiveness, necessitates military training, and this differs materially in the two services. Not only does naval aviation require different types of aircraft from land aeronautics, but a different kind of training, to fit flyers for fleet operations and coast and sea patrol. Ability to fly a machine is merely the first step; pilots must be trained to cooperate with vessels, to escort convoys, to hunt submarines, and engage enemy vessels as well as aircraft.

SPECIAL TRAINING AND CLOSE COOPERATION ESSENTIAL.

Between separate services it is always difficult to secure the close cooperation that is required in military operations. By retaining aviation as a part of the Navy and Army, jealousies and clashes over command, almost inevitable where they have to depend on a separate service, are avoided. Each provides the training for its needs, and keeps in operation an organization, standardized in methods and equipment, which, in time of war merely needs to be expanded, absorbing the new personnel into a membership already indoctrinated and familiar with purposes and operations.

OFFICERS CAN ALTERNATE IN FLYING AND LINE DUTIES.

Another important point is that officers can, to some degree, alternate in duties of the regular line and those of aviation, thus familiarizing them with the Air Service, and insuring a constant exchange of ideas, a better understanding and warmer sympathy, and a higher degree of cooperation between the two branches of the service.

By retaining aviation as a part of the Army and Navy, places can be provided for the flying personnel, who can pass back into the line when their flying usefulness becomes diminished. This could hardly be done by an independent service, which would, in time, at a considerable expense to the Government, result in a large class of specialist officers available only for particular duties on the ground, and for whom there would be no really important activity. Efficiency, economy and effectiveness all appear to demand that naval aviation be conducted by the Navy.

JOINT ARMY AND NAVY BOARD ON AERONAUTICS.

A joint Army and Navy board has been created to bring about closer cooperation between the two services and consider all phases of the aviation activities of Army and Navy. This board is composed of:

Army members.—Maj. Gen. Charles T. Menoher, U. S. Army, chairman; Lieut. Col. Byron Q. Jones, A. S.; Lieut. Col. George A. Nugent, C. A. C.; Lieut. Col. Shepler W. Fitzgerald, A. S.; Capt. A. J. Clayton, A. S., secretary.

Navy members.—Capt. Thomas T. Craven, U. S. Navy; Capt. Lyman A. Cotten, U. S. Navy; Commander J. C. Hunsaker, U. S. Navy; Commander Warren G. Child, U. S. Navy.

TWO SERVICES BROUGHT INTO CLOSER TOUCH.

This board is to make recommendations for coordination of the aeronautic work of Army and Navy, in production, training, operation, selection of aviation bases and sites, purchase of material abroad, etc., and also for coordination with the aviation activities of other branches of the Government and civil organizations. A great deal

has been done toward bringing the two services in closer touch, acquainting each with the activities of the other, preventing duplication of work and installation, and utilizing, wherever possible, the facilities existing or to be established, to whichever service these may belong.

RESERVE OF 4,000 TRAINED OFFICERS AND 20,000 MEN.

As a result of war activities, naval aviation is now supplied with a Reserve Flying Corps comprising approximately 4,000 officers and 20,000 men, of which more than 2,500 of the officers are qualified naval aviators and 1,500 are aviation technicians and administrators. The enlisted personnel of the Reserve Corps has been trained for aviation duties, and, as a class, are believed to be as expert aircraft mechanics as the present state of the science can develop.

AIRCRAFT OPERATIONS WITH THE FLEET.

Relieved of the pressure of war, it has been possible to give further consideration to the broad development of naval aviation as an auxiliary to fleet operation, and a fleet air detachment was assigned to the United States Atlantic Fleet, during the maneuvers at Guantanamo, consisting of six twin-motored flying boats, three single-seater scout airplanes, and a division of kite balloons, with the U. S. S. *Shawmut* as mother ship.

USED IN SEARCH, BOMBING PRACTICE, AND SPOTTING.

The detachment served with considerable success. The flying boats were used for search problems, bombing practice, and spotting. Spotting for the fleet was also done by land-type machines with marked success. Kite balloons were used from battleships. Certain of the battleships have also been supplied with flying machines mounted upon the ships' turrets, from which they are launched.

METEOROLOGY UTILIZED—GENERAL STUDY OF THE UPPER AIR.

The war has shown the importance of securing and dispensing reliable meteorological data to ships and stations concerned with aeronautical work. Pilots will require weather reports covering a wide area before commencing flight. Steps are being taken to make meteorological work an effective part of aviation, and cooperate with the Army and the Weather Bureau in a general study of the upper air.

NAVAL AIRCRAFT FACTORY A PERMANENT ASSET.

In my report last year an account was given of the creation of the naval aircraft factory at Philadelphia and its subsequent enlarge-

ment to take care of the increased production program. The new 1,100-foot assembly plant, the storehouse, and office buildings have been completed, the entire plant getting into production on July 6, 1918. The total floor space available was 888,935 square feet, of which 500,000 square feet were used in manufacturing and the rest for offices and storage.

After the armistice, quantity production was stopped and the plant reorganized for its changed functions. The manufacturing facilities were reduced to occupy 180,000 square feet of space, which is sufficient to carry on repair and alteration work and the construction of new and experimental aircraft in limited numbers. The great volume of space made available by the contraction of manufacturing is being fully used for storage of excess stocks of aircraft material, including aircraft returned from abroad.

The contraction and the resulting economy is measured by the reduction in force from 3,643 on November 4, 1918, to 1,202 November 1, 1919. The total investment in the plant is a little over \$4,000,000 and the total value of the aircraft produced is about \$10,000,000.

The naval aircraft factory was built primarily as a war measure to augment the development and production facilities of the country, and as such it saved the Navy's aircraft program by producing thoroughly satisfactory flying boats at such a rate that two months before the armistice all United States naval air stations abroad were fully supplied.

TO KEEP IN FOREFRONT OF AIRCRAFT DEVELOPMENT.

With the return to peace, naval aviation faces many difficult development problems. New uses for aircraft with the fleet are seen, and the Navy must develop new and radically different types, especially adapted to peculiarly naval functions. The naval aircraft factory is available, with its seasoned organization, and is expected to play a large part in the successful solution of the problems involved in changing over from the antisubmarine aviation to aviation with and in the Fleet.

It is not unreasonable to assume that the Navy in the air will develop largely along the same lines as the Navy in the water, becoming segregated into various types for various purposes comparable to battleships, cruisers, destroyers, etc., but each type will develop steadily. For some years to come we may expect development to be very rapid. The Navy fully appreciates the present value and future possibilities of its aviation, and is pressing development to the limit.

GREW, IN WAR PERIOD, TO FORCE OF NEARLY 50,000.

The growth of naval aviation from a handful of pilots and enlisted men to a force of 48,749 was one of the notable achievements of the

war. The well coordinated system of training personnel and producing material adequate for war purposes put into effect in 1917 did not begin to show its real effectiveness until the spring of 1918. Aircraft capable of offensive work against submarines required machines of long endurance and large carrying capacity, equipped with bombs and machine guns. These had to be developed, designed, and constructed. Pilots and mechanics had to be trained for combat, keen observation, and instant action, as well as flying.

Beginning with but one regular air station, Pensacola, Fla., and a personnel of 48 officers and 239 enlisted men, naval aviation grew to a total force of 3,117 officers and 45,632 men, including Marines and men of all ratings assigned to aviation duty. On April 6, 1917, the Naval Aviation Corps comprised 43 officers and 209 men; the Marine section 5 officers and 30 men. On November 11, 1918, there were 282 officers and 2,180 men in the Marine section; 2,835 officers and 32,873 in the Naval Flying Corps, with 10,579 men of other naval ratings assigned to aviation duty.

The Navy's aviation equipment comprised 1,865 flying boats and seaplanes, 242 land planes, 15 dirigibles, 205 kite balloons, and 10 free balloons. A total of 570 aircraft had been sent abroad before the end of hostilities.

27 STATIONS, FORCE OF 18,736 IN EUROPE.

A total of 18,736 officers and men were in service abroad, as follows:

	Navy.	Marines.
Officers.....	1,237	182
Enlisted men (aviation ratings).....	8,215	1,030
Enlisted men (aviation duty, miscellaneous ratings).....	8,072	
Total.....	17,524	1,212

There were in operation 51 aviation units, including schools, detachments, patrol stations, and supply and repair bases. Twenty-seven stations were built in Great Britain, France, and Italy, despite the many difficulties, particularly of transportation, that had to be overcome in their construction.

ANTISUBMARINE OPERATIONS ITS WAR MISSION.

Naval aviation had a very definite but at the same time a limited mission during the war, being engaged mainly in antisubmarine activities—the patrol of coastal waters for submarines and mines, convoy operations, and the bombing of submarine bases. There are on record 15 instances in which submarines were attacked, and possibly damaged or sunk, through the efforts of United States naval aviators

serving in Europe. Our naval aircraft abroad made 5,691 flights, a total of 791,398 nautical miles. During the last 10 months of hostilities no convoy protected by our naval aircraft was successfully attacked.

EIGHTEEN STATIONS BUILT AND OPERATED IN FRANCE.

Our greatest aviation activity was in France, where a powerful establishment was created, and our new and inexperienced personnel built their own stations and operated them with an efficiency not excelled by our Allies on their own coasts. There were 18 stations in active operation in France—9 for seaplanes, 3 for dirigibles, 3 for kite balloons, the northern bombing group, the assembly base at Paulliac and the training school at Moutchic. The first organized unit of the American armed forces to proceed abroad was the naval aviation detachment commanded by Lieut. Commander Kenneth Whiting, which landed at Bordeaux June 5, 1917.

NORTHERN GROUP BOMBED SUBMARINE BASES.

In the summer of 1918 the northern bombing group was established in northern France, under command of Capt. D. C. Hanrahan, to assist the Dover patrol in aircraft raids over the German submarine bases at Bruges, Ostend, and Zeebrugge. Operating from its base in northern France, this group, which included a detail of Marine aviators, dropped on these U-boat bases approximately 18,000 pounds of bombs. Prior to the establishment of these American units, aviation personnel was loaned to the fifth group of the British royal air force to assist the British in bombing raids over German bases. Sixty tons of bombs, it is estimated, were dropped on enemy objectives during these operations.

ACTIVITIES IN ENGLAND AND IRELAND.

Activities in England were carried on at two operating stations and one base, with a success which exceeded expectations. Prior to the establishment of these bases, many of our pilots were attached to various air stations for training and active work with the British personnel. Thus we gained an intimate knowledge of British procedure and practice. That the services of our young men were of value was shown by the fact that as the war proceeded we were requested to supply more pilots to the British and to take over more stations.

In Ireland there were four patrol stations and one base, under command of Commander F. R. McCrary. These posts had been in commission on an average of but two months when the armistice was signed; but they had an important place in the future plans of

Allied aviation which would have been clearly evidenced if the war had continued.

AIDED ITALY IN OPERATIONS AGAINST AUSTRIANS.

Our activities in Italy, under the cognizance of Capt. C. R. Train, Naval Attaché, assisted by Lieut. Commander J. L. Callan, consisted of the training of pilots on Italian machines supplied for our uses, bombing raids carried on over the Austrian harbor of Pola, and the work of certain naval aviators as chasse pilots with the Italian aviation forces during the Austrian offensive in the fall of 1918. Our cooperation with the Italians was so successful that, had the war continued, it was planned to expand this unit to a much larger force in order to man several additional bombing stations in the Adriatic.

The moral effect upon the enemy was quite as important as the material results of our aviation enterprise abroad, and there is no doubt that it had a very positive effect upon the result of the war.

OPERATIONS IN THE UNITED STATES.

Patrol, training and experimental stations, supply and repair bases, and schools—a total of 24 naval aviation units—were in operation in the Americas. Patrol operations were carried on by American personnel at two stations in Nova Scotia, nine in the United States, and one in the Canal Zone, and the entire Atlantic seaboard and Canal Zone were patrolled.

Naval aircraft flew a total of 2,455,920 nautical miles on patrol duty over home waters during the period of hostilities, and 10,949,340 nautical miles in training during the same period.

208 NAVAL AVIATION CASUALTIES DURING THE WAR.

The total naval aviation casualties during the war were 208, of which 74 were officers. Capt. H. I. Cone, commanding United States naval aviation forces, foreign service, was seriously wounded October 10, 1918, by explosion of the torpedo which sank the British steamship *Leinster*, on which he was proceeding to Ireland, but fortunately recovered from his wounds.

DEMobilIZATION OF AIR STATIONS IN EUROPE.

Immediately after hostilities ended, steps were taken to demobilize the aviation forces abroad, and this was rapidly accomplished. Following are the air stations in Europe and the dates on which they were demobilized:

ENGLAND—

Killingholme	January 6, 1919.
Eastleigh	April 10, 1919.

IRELAND—

Whiddy Island	January 29, 1919.
Berehaven	February 12, 1919.
Wexford	February 15, 1919.
Lough Foyle	February 22, 1919.
Queenstown	April 10, 1919.

FRANCE—

Dunkirk	January 1, 1919.
Mouthic	January 1, 1919.
La Pallice	January 5, 1919.
Arcachon	January 7, 1919.
Guipavas	January 13, 1919.
Gujan	January 15, 1919.
St. Trojan	January 19, 1919.
Treguier	January 19, 1919.
L'Abervrach	January 22, 1919.
Ile Tudy	January 25, 1919.
Paimboeuf	January 26, 1919.
Le Croisic	January 28, 1919.
Fromentine	January 28, 1919.
La Trinite	February 5, 1919.
Northern Bombing Group	February 10, 1919.
Paullac	February 15, 1919.
Brest	February 15, 1919.

ITALY—

Porto Corsini	December 31, 1918.
Bolsena	January 2, 1919.

ASSISTED IN MANNING GERMAN SHIPS.

A large number of officers and men from naval aviation were retained abroad, after the stations were demobilized, and assisted in forming the crews for the German ships taken over and manned as transports for the return of troops.

DEMobilIZATION IN THE UNITED STATES.

Demobilization of naval aviation in the United States was begun soon after the armistice. Production of aircraft was curtailed and contracts for 1,728 aircraft of various types were canceled. Enrollment of additional personnel ceased and it was decided to complete the training of only those student officers and men who were far advanced and wished to qualify as pilots or mechanics. Officers and men were placed on inactive duty until the personnel was reduced to peace-time requirements, as is shown by the following statement of personnel at various periods:

	November 11, 1918.	January, 1919.	April, 1919.	July, 1919.	October, 1919.
Officers.....	2,853	2,689	1,873	701	608
Men.....	43,452	31,282	15,091	1,217	1,889

The lowest point was reached in July, and recruiting was resumed in the effort to bring personnel up to the 5,000 required for peace time.

GROUND SCHOOLS AND SIX STATIONS CLOSED.

All the ground schools were closed, excepting the Aviation Mechanics' School at Great Lakes Training Station.

The two air stations in Canada were turned over to Canadians, in accordance with terms of agreement, in December, 1918. Construction at Galveston was discontinued. The air stations at Montauk, Long Island; Morehead City, N. C.; Brunswick, Ga., and Miami, Fla., were closed; also the kite balloon stations at Marginal Parkway, N. Y., and Charleston, S. C. Naval training was removed from Akron, Ohio, and negotiations are now in progress toward selling the naval property at that place.

Sales of aircraft have been made, and are being made, in accordance with policy.

PERMANENT STATIONS—FLEET AVIATION DETACHMENTS.

The peace program of naval aviation calls for six heavier-than-air patrol stations within the coastal limits of the United States. One patrol station is being maintained in the Canal Zone. Two fleet aviation detachments are planned; one for the Atlantic Fleet exists, and the other for the Pacific will be in operation shortly.

THE NORTH SEA BARRAGE—ITS WONDERFUL EFFECTIVENESS.

The importance and value of the mine barrage in the North Sea was just beginning to be appreciated when the armistice was signed. The long and effective fight of American and allied destroyers and other craft against the German U-boats was reinforced in the summer of 1918 by the construction of the mine barrage. This antidote of the submarine began to show deadly results almost from the start, and on July 9 the British Grand Fleet at Rosyth was apprised of the disablement of an enemy submarine while attempting to cross the barrage. At the close of hostilities at least 10 submarines had been sunk in attempting its passage.

MORALE OF GERMAN NAVY SHATTERED.

It is rare in the history of wars that the naval personnel of any nation has lost its morale. In all nations there is a tradition which has guided men of the Navy to fight to the finish and, then, if victory was impossible, to go down with the ship. That was the spirit of the men in the German Navy in the early days of the war, in the battle of Jutland, in the long days of resourceful and terrible and criminal

destruction of merchant shipping by the U-boats. Age-long tradition and practice were shattered when the German sailors rebelled and the news leaked out of the deterioration of the morale of the German Navy before the Hindenburg line was broken or the acceptance of President Wilson's fourteen points and the signing of the armistice by the German Army commanders was foreshadowed. What was the culminating offensive that ended German submarine destructive efficiency and destroyed the zeal and daring of its naval men? It was the mine barrage. The destroyers had harried, punished, and sunk more U-boats than the allied forces were ready to claim. Indeed from the first they were free from making claims concerning which there could be the slightest doubt. The Germans lost 200 submarines during the war, and never had the allied naval force claimed to have sunk or disposed of so many. Their moderation in acclaiming their achievements has been recognized and approved more since the facts became known than during the anxious days of war.

FEARED MINES MORE THAN DESTROYERS.

As long as the U boats could sail out of Heligoland and make their way safely through the North Sea, except when detected by the limited number of allied destroyers, their crews felt they had a better chance than the destroyers, because they could submerge when in danger of being hit. In spite of the deadly aim and the skill and effectiveness of the destroyers, numbers of submarines did long successfully run the gauntlet. It was not until experience taught them there was no escape from the mine barrage trap that U-boat crews felt they were fighting against a deadly foe which they could not sail under or over or around. The U-boat commander found adventure in evading a destroyer. He had at least an equal chance for his ship and his crew. What chance had he against the machines of death laid at such depths as to bar egress through the North Sea? That barrage was an effective barrier in the only zone left for operation.

HESITATED TO RUN INTO DEATH TRAP.

When the men of the German Navy understood they were going into the jaws of an unseen death trap they were no longer inclined to go joyously about their business of murdering men and women by the U boat, any more than men would gaily put their heads in a halter. From the moment they knew that half a score of their submarines had been destroyed by the barrage, the morale of the German U-boat crews was lowered, and the German leaders saw that their chief hope of winning the war could no longer be entertained.

It is always difficult to assess the true value of any single military success, where so many instrumentalities are employed, other than the final one that brings decision. In this war no single battle on sea or land or in the air brought the victory. It was too immense even to produce one master overshadowing figure. The Germans pinned their faith to U boats as the decisive factor. As the last and greatest instrumentality of ending the U-boat campaign, the mine barrage across the North Sea may be regarded as among the outstanding effective contributions to allied success.

PROPOSED BY UNITED STATES IN 1917.

From the entrance of America into the World War the plan of shutting up the German submarines in their bases ("preventing the hornets from escaping from their nests," as President Wilson put it) was uppermost in the thoughts of Navy officials, naval officers, and thoughtful civilian leaders. This great barrier to the exit of the enemy submarines from their bases was conceived in concrete form in 1917, and the Navy Department proposed its construction as a joint gigantic operation by the American and British Navies. As soon as it was agreed upon, work was begun by our Bureau of Ordnance on the vast number of mines required for that purpose. Then merchant ships were acquired and converted into mine carriers under the direction of Capt. R. R. Belknap, who was in command of the new enterprise in its inception. In March, 1918, the preparations were nearly completed, and Rear Admiral Joseph Strauss was sent to Scotland to take command of the expedition, complete arrangements for laying the barrage, and carry the work forward rapidly and effectively.

STRETCHED 230 MILES FROM ORKNEYS TO NORWAY.

The eastern end of the barrier was to abut at the 3-mile limit of Norwegian waters between the latitude of Bergen and the island of Utsire, and thence stretch across the North Sea for a distance of 230 miles to within 10 miles of the Orkney Islands, north of Pentland Firth. It was deemed that the latter strait, on account of its strong currents and rough seas, would not constitute a serious leak in the barrier. The western passage of 10 miles was to be patrolled by surface vessels. The leak at the eastern terminus afforded by the territorial waters of Norway in the neighborhood of Utsire was closed by a mine field laid by the Norwegian Government in order that her neutrality could be maintained.

LAI, ROW UPON ROW, TO DEPTH OF 240 FEET.

In depth the mines were laid, row upon row, down to 240 feet: below this point no submarine will venture with a reasonable hope of

escaping crushing by the tremendous hydrostatic pressure. The entire project called for about 60,000 American mines and 13,600 British mines.

AMERICANS LAID 56,611 MINES; BRITISH 13,652.

The mine layers arrived in Scotland at the end of May and laying was begun June 8 and continued to October 26, when negotiations tending to end hostilities were entered upon. We actually laid 56,611 mines and our British partners in this scheme laid 13,652 when the work was ended.

The laying of this barrage, in the peril of cold and stress of storm and imminent danger from the high explosives, demanded the highest skill and stoutest hearts, as well as disregard of discomfort and danger. No similar task of this magnitude had ever been attempted. Not a few men of affairs and experience with the sea believed it an impossible undertaking. The authorities at Washington fully appreciated the difficulties and dangers, and realized that no barrage could be depended upon absolutely to prevent all submarines from getting out of the hornets' nest, but as every other offensive had proved only partially effective, it was decided to venture many millions and ask brave and resolute sailors to undertake the biggest and final effort to defeat the U-boats. From first to last, naval statesmen and experts realized that no single operation and no one patented scheme could accomplish the desired result. There is no story of like undertaking comparable to that of the laying of the barrage except that of the sweeping of the mine field. It involved dangers and hardships little realized except by those engaged in the task. The men who laid and swept the mines were the heroes of a sea armada where death lurked every moment.

SWEEPING UP MINES DIFFICULT AND DANGEROUS.

By agreement, the American mines were to be swept by the American mine forces. Even if these mines had been laid at ordinary depths, the number alone would have made this mine sweeping an unprecedented operation; but because of the special purpose of the barrage to prevent the passage of submarines, the lower mines were laid at great depths so that a submarine could not dive under them, and sweeping at depths of 200 to 300 feet was a problem which had never in the history of mine sweeping been encountered. New gear and new methods had to be developed before this new and difficult task could be undertaken.

NEW METHODS TESTED BY EXPERIMENT.

Preliminary experiments were conducted in December, 1918, on the mine field itself, but the task of actual removal was not begun

until later, the weather in the North Sea making it impossible profitably to do the work in the winter months.

The first mine-sweeping operation, which was purely experimental and on a small scale, took place on April 30, 1919, but the mine-sweeping detachment had not been idle during the period since the armistice. On the contrary it had been busily engaged in improvising methods which would be suitable for the work of sweeping up mines, in accumulating stores of mine-sweeping material which would be necessary during the operation, in obtaining additional ships to carry on this great amount of work, and in fitting the vessels suitably for their employment.

A principal base was established in Kirkwall, in the Orkney Islands, contiguous to one end of the great mine field. A notable feature to be recorded is the fact that the *Black Hawk* kept the fleet repaired, despite the extraordinary casualties to machinery that occurred as an unavoidable consequence of the nature of the work upon which the sweepers and submarine chasers were engaged.

82 VESSELS EMPLOYED IN SWEEPING OPERATIONS.

The force actually employed in sweeping operations consisted of 82 ships, divided as follows: 36 sweeping vessels, 20 trawlers, 24 submarine chasers, 1 salvage vessel, and 2 repair ships. The personnel of these vessels was entirely American, and a large proportion of the 4,000 officers and men manning them were of the reserve force. The war was over, yet this force of officers and men working under difficult and hazardous conditions, kept at work with surprising persistence, maintained a high morale, were cheerful and loyal, and the excellence of the personnel contributed greatly to the success of the whole operation.

GREAT CREDIT DUE ADMIRAL STRAUSS AND HIS FORCE.

That the maintenance of such a wonderful spirit in a force is largely due to the personality and ability of the officer in immediate command cannot be gainsaid. Great credit is due and must be given to Admiral Strauss for the high character of the leadership which he displayed, his persistence in carrying on the work against all obstacles, and for the excellent results which have been obtained by the force under his command.

ONE SWEEPER LOST—MANY DAMAGED BY EXPLOSIONS.

There were, in all, eight mine-sweeping operations, and in nearly every one mine sweepers were badly damaged by explosions near them. The trawler *Richard Buckley* was sunk by a mine explosion

on July 12, with the loss of her commanding officer, Commander F. R. King, and the following members of the crew :

Floyd Harman, of Roann, Ind.; engineman, first class.

John Vincent Mallon, of Brooklyn, N. Y.; seaman.

Homer Perdue, of Washington Court House, Ohio; seaman, second class.

Antino Perfidio, of Brooklyn, N. Y.; ship's cook, first class.

George Paul Rezab, of Warman, Minn.; fireman, second class.

George M. Sowers, of Knob Lick, Ky.; fireman, first class.

Lieut. Frederick G. Keyes and Lieut. (j. g.) Walter E. Sharon were injured by the explosion but were saved.

COMMANDER WENT DOWN WITH HIS SHIP.

The *Buckley* was heaving in her kite, when it fouled a mine which exploded near the stern, the vessel sinking in six or seven minutes. Commander King made every exertion to save his crew and remained until the last, going down with his ship.

On the 9th of July no less than six mines countermined under and near the *Pelican* and so damaged the vessel that it was only by the skill and plucky seamanship of the late Capt. R. C. Bulmer that the vessel was brought into port.

On May 14 Lieut. Frank Bruce, commanding the *Bobolink*, was killed by the explosion of a mine which he was attempting to clear, after ordering his crew forward to get them clear of the explosion which he expected to take place. On July 28 Robert I. Simpson, seaman, was washed overboard from the *Curlow* as a result of a mine explosion.

TWO OFFICERS AND NINE MEN KILLED—23 SHIPS DAMAGED.

Altogether 2 officers and 9 men were killed during these hazardous operations and 23 ships were damaged. Regrettable as was this loss of life, it was small in comparison with the number lost in the British mine-sweeping service. Mine sweeping is recognized as the most dangerous work afloat, and our small loss in the great task in the North Sea is an evidence of the care with which the undertaking was organized and conducted.

ALL MINES CLEARED AWAY BY SEPTEMBER 30.

The active systematic work of removal began May 8, and was carried on with the utmost energy. Intervals of only five or six days to effect repairs, refuel, and renew gear elapsed between the different operations. Although working steadily in this way it did not seem possible that the whole barrage could be swept before the winter gales would stop operations for the year; yet the work was so persistently and intelligently carried on that the entire barrage was swept by September 30. On that day all hazard to shipping, caused

by our great enterprise in the North Sea, was removed. A total of 20,711 mines were actually destroyed. The remainder had not survived the severe storms, had exploded on laying, or countermined during mine sweeping.

CHEERFULLY FACED HARDSHIPS AND DANGER.

Too much can not be said in praise of the officers and men who accomplished this task. Working without the incentive of the extra pay allowed by our allies for similar work, they remained at sea three to four weeks at a time, lying hove-to in storms, waiting on the ground for an opportunity to again attack, as soon as the weather would permit; averaging 14 hours of sweeping a day for the entire time; foregoing holidays and shore leave, taking advantage of every bit of daylight, disregarding danger, in order that the sea should again be made safe for peaceful commerce.

REVIEWED ON RETURN TO AMERICA.

Upon their return to the United States in November they were given a welcome as genuine as when our dreadnaughts returned from service abroad. The mine force was reviewed Monday morning, November 24, as it steamed up North River, by the Secretary of the Navy and distinguished officers and citizens on Admiral Strauss's flagship, the *Black Hawk*. At a luncheon given in New York to the officers and men the Secretary voiced the country's appreciation of the magnificent and successful completion of that most hazardous and strenuous operation.

THE NAVY'S WORK ABROAD SINCE THE ARMISTICE.

When the armistice was signed, the work of the Navy abroad changed. From intense activity in which an ever-increasing number of destroyers, in cooperation with allied craft, reinforced and aided more than has been appreciated by the mine barrage across the North Sea, had definitely won the victory over the U-boats, it was to carry on less strenuous but almost as important and more delicate diplomatic and demobilization tasks.

ADMIRAL BENSON NAVAL ADVISOR OF PEACE MISSION.

Admiral William S. Benson, Chief of Naval Operations, was the representative of our Navy in arranging the naval terms of the armistice, was the naval adviser of the peace mission and directed the many varied duties undertaken by the Navy during the important days from the surrender of the German fleet to the sinking in Scapa Flow. His judgment was relied upon by members of the Allied Naval Council, the American Peace Commission, and the Food Administration and

other agencies of relief which required naval assistance. With an able staff, Admiral Benson rendered service of the highest importance, winning rank as one of the world's ablest naval statesmen. He has been decorated not only by his own country, but by France and Great Britain, and is worthy of the high distinction of admiral for life which the House of Representatives voted should be conferred upon him.

ADMIRAL SIMS'S DISTINGUISHED SERVICE.

In the Allied Naval Council, Admiral William S. Sims, who had been the able representative of the Navy in Europe during the entire war, displayed ability of the highest order. His brilliant services abroad won world-wide admiration and he demonstrated that he is worthy of the highest honors Congress can confer upon him. Admiral Hugh Rodman, who had commanded the dreadnaughts in the North Sea, represented our country in receiving the surrender of the German Fleet and was justly honored and decorated by allied nations. In March, 1919, after receiving deserved and distinguished honors and many expressions of the esteem in which he is held, Admiral Sims set sail for home, to become the president of the Naval War College, where he has already set a new and higher standard which will insure an enthusiasm and zeal and knowledge on the part of the naval officers privileged to attend the War College which will be reflected in a more efficient Navy of the future. He was succeeded in command of the United States naval forces in European waters by Rear Admiral Harry S. Knapp, one of the ablest and wisest of naval officers, who also, upon the return of Admiral Benson to this country, became our naval adviser to the Peace Conference at Paris.

ADMIRAL KNAPP A WORTHY SUCCESSOR.

Though the stress of war called for resource and initiative, the days of reconstruction, demobilization and helpfulness of all American activities made demand for no less ability in the head of the naval leader abroad. The duties committed to Admiral Knapp called for knowledge of international law, sound judgment and wisdom as well as proven capacity as a naval officer. In all the difficult, delicate, and important duties intrusted to him during the months of readjustment, Admiral Knapp has given full proof that his countrymen could safely rely upon him in counsel and in action. He has been a worthy successor of Admiral Sims.

MR. ROOSEVELT'S MISSION IN EUROPE.

Upon the signing of the armistice and the closing of naval shore activities abroad, the Navy had a number of stations in Europe, and

valuable material and equipment. In order that it might be sold, salvaged, or brought to America, as in each case was most desirable, Assistant Secretary Roosevelt, accompanied by Commander John M. Hancock, who had shown high ability in the business side of the Navy in cooperation with the War Industries Board, and Mr. Thomas J. Spellacy, an able lawyer, as legal adviser, went to Europe in January and made arrangements by which the Navy's demobilization could be expedited and its property disposed of to the best advantage.

The plans perfected and the negotiations completed have resulted in the disposition of naval property in a way that has been wise and beneficial. The great high-power radio station in France was, through negotiations with the French Government, completed by our Navy, with the agreement that it be purchased by the French Government. Equipment and material that will be needed at home has been brought back, and such as was not practicable or profitable to transport has been sold abroad.

ARMISTICE IMPOSED NEW DUTIES.

With the acceptance by Germany of the armistice terms, the surrender of the major portion of the German submarines and the internment of the greater portion of the main German fleet, the necessity for maintaining a large naval force in Europe on a war footing disappeared. It was immediately apparent that the bulk of our naval forces could be returned to the United States and that the various shore establishments, necessary to the life of the Navy in Europe, could be demobilized. At the same time, it was realized that much would remain to be accomplished by the Navy in European waters in connection with carrying out various provisions of the armistice terms; in assisting in the return of American troops to their home country; in the incidental work of maintenance of such naval units as were retained on this side of the Atlantic; in mine sweeping, and in disposing of the vast stores of material collected in Europe for the prosecution of the war. What new activities would have to be created and to what extent the Navy would be employed in Europe during the year following the armistice, could not be foreseen; in this respect it was necessary to await developments.

DEMOBILIZATION OF EUROPEAN FORCES.

On November 11, 1918, there were 5,352 officers and 75,213 enlisted men on duty in European waters, a force considerably larger than the whole personnel in the Navy prior to the war. This personnel was distributed in upwards of 400 vessels; in battleships with the

Grand Fleet in the North Sea; in mine layers that had just completed laying the largest single mine field—between the Orkneys and Norway—that had ever been attempted; in across-channel service between Southampton and Cherbourg; in destroyers, operating on the southern coasts of England and Ireland, on the west coast of France, from the Azores, Gibraltar and Corfu; in a cruiser in northern Russia, in colliers, tugs, repair ships, the necessary adjuncts of a fleet in being; and on shore in the great 14-inch railway batteries; at air stations in Ireland, England, France, and Italy; in communication services in many places; and at bases on shore wherever the service of the fleet made repair and administration facilities necessary.

Since the armistice 80 vessels, principally destroyers and mine sweepers, have been sent to Europe from the United States, 20 trawlers were chartered in the United Kingdom for service with the mine-sweeping detachment, and 11 ex-German vessels have been commissioned, but of the grand total of some 500 vessels that have served in foreign waters, only 108 remained on October 1, and of these, 68 were returning or under orders to proceed home, 7 are to be sold in Europe, 2 are to be returned to their British owners, and 2 badly damaged mine sweepers are being extensively repaired.

Of the vessels that remain, only five were on the European station on November 11, 1918. Of the great shore establishments which had been built up during the war, but a remnant remains—staff offices in London and Paris, and port offices in Brest and Gibraltar—all the air stations, repair plants, the bases and other port offices have been demobilized. A total of 1,014 officers and 12,701 enlisted men were still on the European station October 1, 6,112 officers and 73,714 enlisted men having previously been returned to the United States, and many more returning recently on the mine-sweeping fleet, which arrived in November. In comparing these figures with those of the figures of personnel in Europe at the time of the armistice, it must be remembered that there has until recently been a steady flow of personnel to Europe—to man vessels commissioned overseas, to provide for reliefs for reserves, duration of war men, and others, and in the crews of vessels sent out since that date. Taking it altogether, it may be safely reported that the force as it existed at the date of the armistice has, to all intents and purposes, been demobilized.

OPERATIONS OF NAVAL FORCES IN EUROPE.

The operations of the naval forces in Europe during the past year have been of the most varied nature—guarding American interests in disturbed countries in Europe; carrying commissions of inspection and inquiry and insuring communications where land transportation

was not available; assisting in the repatriation of American troops; sweeping the North Sea barrage; the establishment of port offices to further relief work; supervising enforcement of the terms of the armistice—such were some of the miscellaneous duties performed.

ACTIVITIES THAT HAVE BEEN COMPLETED.

Some of these various duties may be considered as completed; such are:

IN NORTHERN RUSSIA.

Vessels have been in northern Russian waters during the last year and were not entirely withdrawn until autumn. The purpose of this force was to guard American interests and to assist in the evacuation of American troops which were forming part of the allied forces operating in this area. The presence of the force served a useful purpose in stimulating the morale and assisting in the evacuation of Americans.

IN THE BALTIC AND NORTH SEA.

Early in January, 1919, American men-of-war visited German Baltic ports to assist in the repatriation of Allied prisoners of war. Since that date our vessels have frequently visited German ports in connection with the inspection of ports and vessels, and in furthering the work of the Shipping Board and American food relief administration. In addition, port offices were established in Antwerp, Rotterdam, Hamburg, and Danzig, and the officers connected with these offices have rendered valuable service in stabilizing conditions, in assisting in the routing and management of American vessels and in the distribution of food. The work of Capt. J. K. Robinson, Capt. D. C. Hanrahan, Commander C. A. Abele, and Commander L. R. Leahy deserves special commendation. Numerous expressions have been received from civil officials of the American Government, on duty in Europe, testifying to the high character, ability, initiative, and resource of these officers under trying conditions. It is hardly too much to say that the work of the Food Administration was in the early stages largely dependent on naval cooperation, and Hon. Herbert Hoover has been warm in commendation of the efficiency of the Navy personnel engaged in this humanitarian work.

In the latter part of May, 1919, a mission, of which Capt. W. C. Cole, United States Navy, was senior member, was sent to Holland to collaborate with a commissioner representative of the United States Shipping Board in the work of the return to their owners of Dutch ships requisitioned by the United States in March, 1918. This work was completed in a manner worthy of the best naval traditions, on October 1, 1919, 54 ships having been delivered of a total tonnage of 369,557 deadweight tons.

FORCES IN FRANCE.

Although the forces in France are not entirely demobilized, yet the end is in sight and the remaining work will apparently follow the course of previous operations. The work of this force has been principally in cooperating with the Army in the return of troops to the United States; and the facilities established by the Navy at Brest, in particular, have been of paramount importance in the speedy accomplishment of this task. It should be realized, however, that immediately after the armistice, the number of vessels operating in Europe under the direction of the Shipping Board largely increased and many vessels, besides transports, called at French ports where United States naval facilities were at their disposal. These facilities included routing of vessels while mine fields along the coast were still in existence, in giving them fuel and repairs and insuring rapid discharge or loading, as the case might be, of the vessels concerned, and generally in expediting turn-around.

Special mention should be made of the salvage facilities which have been established on the French coast, the full report of which shows important naval tasks well performed. A naval unit, having its headquarters at Lille, rendered valuable relief assistance in the housing of refugees returning to devastated areas of France and Belgium.

The forces in France were directed by Admiral Henry B. Wilson with the highest efficiency until his return to America early in the present year. Upon his detachment to become commander in chief of the Atlantic Fleet, the naval activities have been under the immediate command of Rear Admiral A. S. Halstead, and it is largely due to the untiring efforts of this officer that the arrangements for embarkation and repatriation of American troops, so far as the Navy was concerned, were so well handled. Great credit is also due to him for the expeditious and very satisfactory demobilization of our own naval facilities and forces in France.

IN THE AZORES.

It has been necessary to maintain certain facilities in the Azores until very recently. The vessels of this station frequently assisted towing disabled vessels to port and in giving them repairs sufficient to enable them to proceed on their voyages. A battery of 7-inch guns established at Ponta Delgada during the war remains at that place in charge of a small detachment and will probably be presented to the Portuguese Government. The station at Ponta Delgada has been of great importance to the Navy in the demobilization of the smaller craft from this station.

IN GIBRALTAR.

A port office has been retained at Gibraltar and, in close cooperation with the British authorities at that place, has served to expedite vessels of the Navy, Shipping Board and Army transports which have called there for routing instructions, repairs, and fuel. The steamship *Ophir* has been in charge of the port officer ever since that vessel has been salvaged, and is now being repaired sufficiently to enable it to proceed to the United States under its own power with the entire personnel of the port office.

COMMISSIONING EX-GERMAN VESSELS.

Ten ex-German passenger vessels and one cable ship were commissioned in Europe, using principally personnel which were being demobilized from forces in Europe. In addition, six surrendered German submarines turned over to the United States were manned in Europe and sent across the Atlantic, five of them under their own power.

ACTIVITIES STILL REMAINING IN EFFECT.

FORCES IN ADRIATIC.

A force has been maintained in the Adriatic to assist in the execution of the terms of the Austrian armistice, at first under Rear Admiral W. H. G. Bullard, then under Rear Admiral A. P. Niblack, and later under Rear Admiral Philip Andrews. In addition to inspection of Austrian ports and the taking over of certain Austrian vessels, the force has been variously engaged in relief work in conjunction with officials of the Food Administration. The outstanding personalities of the different American admirals who have commanded this force, their tact and ability, have contributed largely toward preventing friction and even collisions in the zone of their special operations where various acute problems have arisen due to the conflicting aspirations of the different nationalities along the Adriatic littoral.

UNITED STATES SAILORS PREVENTED CLASH AT TRAU.

In September a small guard of American sailors were landed at Trau, at the request of Italian authorities. The following dispatch from Admiral Knapp, sent from United States naval headquarters, London, September 30, gives the facts with reference to the landing, and is a concrete example of the wisdom and sound judgment displayed by our naval officers abroad:

The armistice line extends from Cape Planka inland. North and west of this line Italian troops in occupation, south and east of the line garrisoned by Serbian troops. This latter section, Dalmatian coast, headquarters American

naval forces, in which by agreement after armistice American naval forces took charge of all one-time Austrian-Hungarian vessels found there, and which has since been generally called American zone. Americans have no troops on shore, but have extended a strong moral influence for the preservation of order and avoidance of clash between Italians and Jugo-Slavs. There has been considerable friction along armistice line between Serbians and Italians, but by the tactful firmness of American admiral there, it has been kept from causing serious results.

On September 23 three truck loads of Italian soldiers, in command of an Italian army captain, crossed armistice line from Italian zone and surprised and captured the small Serbian garrison at Trau. The Italian authorities informed the senior American officer present, Capt. Boyd, that the move was unwarranted, and asked that the raiders be turned back. Boyd sent a destroyer and two chasers to Trau at once, then saw the Serbian commander and got him to agree not to order an advance until he had an opportunity to get Italians to withdraw. He sent Lieut. Commander R. S. Field and Commander Maroni, of the Italian ship *Puglia*, by automobile to Trau, and himself went in the U. S. S. *Olympia* to Trau. On arrival he found that Italians had been induced to return, leaving, however, Italian army captain and three soldiers, owing to breakdown of truck. He landed a small guard from the U. S. S. *Cowell* and U. S. S. *Olympia* to see no harm was done by Italians and preserve order pending arrival of Serbian troops. He put the Italian army captain and three soldiers on an Italian motor boat and turned them over in charge of an Italian naval officer. Upon arrival of the Serbian troops he withdrew bluejackets, after first receiving assurance that no violence would be offered to civilians.

Italian Admiral Millo, in command of ships and troops in Italian zone of occupation, sent senior Italian officer present at Spalato to U. S. S. *Olympia* with thanks for sending Trau raiders back. He has brought the officer commander of the raiding force to trial by court-martial. The whole affair was most creditably handled and the prompt action of Capt. Boyd, in my opinion, undoubtedly prevented a very serious incident which might have resulted in open warfare between Italians and Serbians. The landing was for the protection of the offending Italians left in Trau until adequate Serbian forces could arrive to preserve order.

The fact that Italian authority requested action of Capt. Boyd, and that he was thanked by Admiral Millo for his action, and that Admiral Millo brought offending officer to trial by court-martial, all go to show that the raid was an isolated act of hot-heads, done in defiance of Italian authority, and that America acted in cooperation with Italians to restore the situation. That no serious result happened is due to the prompt and efficient action of American forces. Had they not so acted, there would almost inevitably have been bloodshed, which would perhaps have resulted in a state of actual war between Italy and Jugo-Slavia, owing to the intensity of feeling existing over the Dalmatian question.

IN TURKISH WATERS.

The force in Turkish waters has rendered valuable service in carrying missions to different ports in Armenia, Turkey, and in advising as to conditions in this demoralized portion of the world. The high purpose and integrity of Rear Admiral Mark Bristol, United States Navy, and his resolute bearing have made of him an outstanding figure in recent Turkish affairs; and the President of the United States has recognized the excellent services which Admiral Bristol

has performed by appointing him United States High Commissioner in Turkey.

Of the flag officers just mentioned, Admirals Andrews and Bristol have been closely associated for such a long period with the affairs in the areas where they commanded United States naval forces, and have maintained such close personal touch with local conditions that the information and advice which they forwarded to the American peace mission is probably of more value than information received from any other source.

COMMUNICATIONS.

Communications in Europe, particularly through disturbed regions, have been greatly assisted and facilitated by the officers and men of the American Navy. The American Navy furnished the working force for the communication offices established for the use of the Peace Commission in Paris. Communication parties have been sent to various points in Europe, and Navy personnel has manned and is manning to-day special lines connecting Paris and Vienna, Warsaw, and Bucharest, and other points in what was previously enemy territory. Regular telegraphic communication is not yet reliable and these special private American lines have been of a value difficult to estimate. By means of a high-power radio set in the United States, it is possible to receive communications in the Force Commander's office in London, on board the *Olympia* in the Adriatic, and at Admiral Bristol's headquarters in Constantinople.

MAINTENANCE AND REPAIRS.

On November 11, 1918, there were naval repair facilities of considerable extent, either afloat or ashore, in the United Kingdom, France, Gibraltar, in the Mediterranean, and at the Azores. Although nearly all vessels of war in Europe were sent home within a short time after the armistice was signed, yet the number of vessels of merchant type operated under naval control by the United States Shipping Board rapidly increased. In addition to a constantly large volume of minor repairs to these vessels, there were numerous cases of major casualty damage which were efficiently and properly handled by our repair organization. Special mention should be made of the work performed by the *Bridgeport* and the repair organization at Brest, which completed some 12,000 items of repairs to men-of-war and vessels of the transport force, and has been of invaluable assistance in the return of the American Expeditionary Force. Of work purely naval in character, special mention must be made of the work performed by the *Black Hawk* and *Panther* in maintaining a large number of mine sweepers, trawlers,

and submarine chasers which were engaged in the hazardous and difficult duties of the Northern Barrage.

FOREIGN COOPERATION.

Allied officials, from the arrival of the first division of destroyers, have uniformly given to the American naval forces in Europe every facility in their power and have rendered invaluable assistance to our Navy in the furtherance of its own particular activities. The British Admiralty, with which our cooperation in the North Sea in operations against the submarines and in other ways was on a larger scale than with the other allied navies with which we were associated, rendered our officers every facility. Our operations with the French and Italians, while not upon such large proportions, were equally agreeable, and every help was rendered and every courtesy shown. Indeed all these nations often gave priority for repairs to American ships. The ties between the navies of these nations were strengthened and cemented by this intimate and delightful service together.

EIGHTEEN GREAT CAPITAL SHIPS UNDER CONSTRUCTION.

During the last year of the war all the energies of the department in the construction line were concentrated on vessels to cope with the submarine menace. As late as October, 1918, we received insistent and urgent recommendations from the representatives of the Allies that the antisubmarine program be accelerated to the limit in view of existing and anticipated conditions. From our entry into the war work upon the later large vessels of the three-year program had been suspended.

With the armistice an accomplished fact, the question soon arose whether these vessels should be pressed to completion on the prewar plans or materially modified as a result of war experience. The principal and indeed the only important question was as regards the battleships and battle cruisers. Should we proceed with the two distinct types on the prewar plans, modify the plans but still build two distinct types, or abandon the plans altogether and build a single type to do the work of both the battleship and battle cruiser? There was being constructed then in England the *Hood*, a vessel with the speed of earlier battle cruisers (though less than that of our design) a heavier battery than that of previous battle cruisers abroad (though still of only about half the power of our latest battleship designs), and protection much greater than that of earlier battle cruisers.

STUDIED LATEST DEVELOPMENTS IN OTHER NAVIES.

The question at issue, involving as it did 12 capital ships which would upon completion be the backbone of the United States Navy for a number of years, was a most momentous one; and it was felt that nothing should be left undone to solve the problem rightly, taking into account the views not only of our service but, so far as available, of all the services which had been involved in the war. For the purpose of consultation with foreign admiralities and officers, in the spring of 1919—accompanied by the chiefs of the three technical bureaus of the Navy Department having to do with the construction of ships, namely, Rear Admiral Griffin, of Steam Engineering; Rear Admiral Taylor, of Construction and Repair; and Rear Admiral Earle, of Ordnance; with Commander Foote, as aid—I took passage for France. The party returned on May 17 after having visited and consulted with the admiralities and distinguished officers of France, Italy, and Great Britain, and after the technical officers who accompanied me had been given ample opportunity to examine the *Hood*, then launched but not completed. The admiralities and officials of each country visited showed the greatest willingness to furnish information and advice, and consulted fully and freely with us as to the questions at issue and other questions of naval experience, naval policy, and naval development.

CONSIDERED BY GENERAL BOARD AND ADMIRALS OF THE FLEET.

Upon my return the matter was taken up by the General Board, composed of Admirals Badger, Fletcher, Winterhalter, Sims, and Niblack, Gen. Barnett, and Capt. Cotten. Although Admiral Sims and Admiral Niblack, of the General Board, were fresh from service abroad during the war and exceptionally well informed as to war experiences, it was felt that in a matter of such importance it would be well to supplement the General Board by the commander in chief of the United States Fleet, Admiral Mayo, and Admiral Rodman, who had commanded the division of the United States Battle Fleet which cooperated with the British Grand Fleet for many months during the war. These were accordingly added as temporary members. At sessions of the enlarged board considering the questions at issue, the three chiefs of technical bureaus who had accompanied me abroad were present, so that the General Board might have the advantage of the large amount of information which they had obtained.

GREATER PROTECTION FOR BATTLE CRUISERS.

After consideration of the matter, the unanimous recommendation of the General Board as temporarily enlarged was that the battle-

ships should be "completed as expeditiously as possible on present lines of development and that future designs of battleships should depend upon further development in battleship construction." As regards the battle cruisers, in view of the importance of protection as indicated by war experience, it was recommended that "the six battle cruisers now authorized be completed as expeditiously as possible, but with additional protection, particularly to turrets, conning towers, magazines and communications, at the expense of a small reduction in speed."

The recommendations of the General Board were at once approved, and I gave instructions to proceed with the work accordingly. There was necessarily some delay involved by reason of the necessity of changing the plans of the battle cruisers, increasing the displacement and the protection and slightly reducing the speed. Revised general plans were placed in the hands of the builders on September 1, and the preparation of working plans and actual construction will go on as rapidly as practicable in view of the large size and immense power of these vessels.

259 VESSELS COMPLETED IN A YEAR.

During the 12 months ending October 1, there have been completed 1 battleship, 103 destroyers, 32 submarines, 52 Eagle boats, 36 submarine chasers, 1 fuel ship, 31 mine sweepers, and 3 seagoing tugs. This leaves under construction at the present time 12 battleships, 6 battle cruisers, 10 scout cruisers, 2 gunboats, 8 auxiliary vessels, 136 destroyers, 58 submarines, 8 Eagle class patrol vessels, 6 mine sweepers, and 14 seagoing tugs.

103 DESTROYERS DELIVERED IN 12 MONTHS.

While the special instructions relative to expediting work on destroyers were canceled after the armistice, work on the war program had by that time been thoroughly organized and deliveries have proceeded rapidly since that date. During the 12 months ending October 1, 1919, 103 had been delivered. Deliveries are now averaging about 10 per month, and it is expected that those remaining, 136 in all, will be completed within the coming year.

These new destroyers are all oil burners, standard type, 315 feet long; beam, 31 feet; mean draft, 9 feet 4 inches, and, equipped with motive machinery of 28,000 horsepower, make 35 knots an hour. They demonstrated their worth in war and in peace, and in themselves constitute a fleet of swiftness and power in which the Republic can safely trust. The story of their successful war against submarines and their successful sinking of those assassins was recorded in last year's report.

NEW RECORDS IN CONSTRUCTION.

Some new records were made not only in speed and achievement by these "gray wolves of the sea," but world records were broken in the short time in which they were constructed. The *Ward*, built at the Mare Island Navy Yard in 1918, was launched $17\frac{1}{2}$ days after her keel was laid, and put into commission in 70 days. On November 6 of this year the *Reid*, built at Squantum, Mass., by the Bethlehem Shipbuilding Co., was delivered to the Navy at Boston. It was constructed in $45\frac{1}{2}$ working days, the shortest time in which a destroyer has ever been completed from the laying of the keel.

52 EAGLE BOATS COMPLETED.

The original program of Eagle class patrol vessels, built at Detroit, included 112 vessels, 12 having been ordered for the Italian Government. These vessels were designed primarily for antisubmarine work but are suitable for general patrol duty such as is assigned to gunboats and small cruisers. Arrangements, when the armistice was declared, were made for the cancellation of the contracts for 52 of these vessels, including those intended for the Italian Government, leaving 60 to be completed. The first three Eagle boats were brought out from the Lakes prior to the close of navigation in the fall of 1918, and have since been in successful service in European waters. By October 1 last a total of 52 had been completed, and it is expected that all 60 will be ready in time to be brought out before the close of navigation this year.

EXCELLENT ANTISUBMARINE CRAFT.

The Eagle boats, built by the Ford Motor Co., were a war product, planned, designed, and built after the United States had entered the war and were primarily intended to operate against submarines. Had the war continued into 1919 and 1920, hundreds more would have been turned out. They are standardized, being fabricated boats, and although not so large nor so fast as the modern destroyers, are far superior to the submarine chasers. They are 550-ton boats, single screw, geared turbine engines, oil burning, and well equipped to fight submarines, being fitted with 4-inch guns and designed to carry depth charge projectors and submarine listening devices. They have a speed of 18 knots and a cruising radius of about 3,000 miles.

THREE MADE 6,000-MILE VOYAGE TO RUSSIA.

The first three of these boats built were sent overseas in the spring of 1919 for duty in northern Russia. They left New York in company on April 11, arrived at the Azores April 24, and left there April 27,

arriving at Plymouth, England, May 2, where they completed fitting out for their duty in Arctic waters. Leaving Plymouth May 9, they arrived at Inverness, Scotland, May 12, and departed on May 15 for Murmansk, Russia, where they arrived May 21. This was a cruise of about 6,000 miles made in a total time of 40 days with only 27 days actual steaming. While no heavy sea was encountered, their behavior on this trip was excellent, the engines and other equipment giving satisfactory results and being as comfortable at sea for the personnel as any ship of the same type and tonnage.

SEVERE TEST PROVED THEIR VALUE.

This trip was made under the most adverse conditions, the officers and crew being comparatively green, having had, of course, no previous experience with boats of this type, and the boats had never been subjected to the test of a long ocean cruise. The ability and success of these Eagle boats was thus proved in an exceedingly practical way, and had the war continued their effectiveness against the submarine would have fully demonstrated the wisdom of their construction.

10,520,000 HORSEPOWER IN ENGINES OF NEW VESSELS.

When the vessels now building or under contract are completed, the propelling power of our ships will be five times as great as it was prior to the war. The addition represented by the destroyers alone will reach 8,000,000 horsepower. To drive these destroyers at the high speed of 35 knots, 40 miles an hour, requires engines of 27,000 to 28,000 horsepower, as much as is required to propel a dreadnaught like the *Utah*, and nearly two and a half times as much as the power in the *Oregon*, the largest type of battleship employed in the war with Spain. To drive the huge new 43,500-ton battle cruisers through the water at 33 knots will require the largest propelling force ever placed in any vessel, engines developing 180,000 horsepower, a total of 1,080,000 horsepower for the six to be built. For the six new 43,200-ton superdreadnaughts, 11,800 tons larger than the *Pennsylvania*, engines of 60,000 horsepower will be required—a total of 540,000 horsepower. The ten scouts will have an aggregate of 900,000 horsepower. With these additions the machinery of the fleet will have a total propelling force of 13,000,000 horsepower—eight times as great as that of all the passenger-carrying ships that ply the Atlantic, including the big former German liners.

BATTLESHIPS STEAMED 1,424,321 MILES IN A YEAR.

During the last fiscal year our battleships alone steamed 1,424,321 miles; our destroyers in European service, during the war period, made as high as half a million miles a month; the transports operated

by the Navy, plying constantly between America and Europe, steamed millions of miles, and in addition there were hundreds of submarine chasers, armed yachts, auxiliaries, tugs, and other craft in operation.

NEARLY 2,500 VESSELS IN OPERATION OR BUILDING LAST YEAR.

On July 1, 1918, the Navy was operating or building 2,275 vessels, including 570 regular naval vessels, 93 drawn from the Coast Guard and Government departments; 937 converted merchant vessels, comprising all types from troop transports to craft of the mosquito fleet; 247 vessels of the Naval Overseas Transportation Service; and 428 combatant and auxiliary vessels in service. Before hostilities ended this number was further increased by some 125 ships added to the Overseas Transportation Service, and additions of destroyers and other vessels completed for the Navy.

This will give some idea of the immense volume of work of the Bureau of Steam Engineering in maintaining propelling and auxiliary machinery. In addition it supervises the designing and building of our engines and machinery, and one of the most difficult construction problems of the war was the securing of the large numbers of engines required for destroyers, submarine chasers, Eagle boats and other vessels building for the Navy.

THOUSANDS OF AEROPLANE ENGINES BUILT.

In addition to the hundreds of engines for vessels, 2,655 aviation engines for naval aircraft were delivered, and 3,989 were under construction when the armistice called a halt in production. Radio installations on ships built or contracted for numbered about 4,000, and equipment was furnished for 210 independent shore stations. The high-power radio stations erected during the war were designed and constructed under the supervision of this bureau.

BUILDING ELECTRIC MACHINERY IN NAVY YARD.

Its success being thoroughly demonstrated in the *New Mexico* all our new battleships and battle cruisers are to be equipped with the electric drive. This has made it necessary that at least one of our navy yards be equipped to handle any work that may develop in connection with this new installation. Accordingly, it has been decided to construct at the New York Navy Yard the machinery for one of the four latest battleships, two of which will be built there. The machinery for the others will be procured by contract, but that to be built at New York will be from the same plans, the contractors furnishing complete working drawings and from time to time such technical advice as may be necessary. In this way it is believed that

the navy yard will acquire the experience required to undertake any repairs that may become necessary on vessels equipped with electric machinery.

NAME OF BUREAU SHOULD BE CHANGED.

The official designation of the Bureau of Steam Engineering does not by any means convey an idea of its activities—in fact, it is a misnomer. It was adopted at a time when steam was the only form of mechanical energy in use, and although the major portion of the duties of this bureau are still concerned with steam and its application in mechanical engineering, the adoption of electric drive for capital ships has largely increased its electrical engineering duties, previously concerned with electric lighting and the supply of power for comparatively small electric motor installations. In addition to these, its activities in radio engineering have long been of the first importance, while the advances in submarine construction and in aircraft have greatly increased its duties as regards oil and gas engines.

In view of these varied activities, I suggest that the designation of this bureau be changed to the "Bureau of Engineering," as being more comprehensive and more accurately descriptive of its duties.

LARGEST NAVAL GUNS FOR OUR BATTLESHIPS.

Guns larger than any now in use or being placed afloat by any other navy are being built for our new battleships and battle cruisers. Of 16-inch, 50-caliber, with muzzle energy of 115,000 foot-tons, these are the last word in American naval design. One hundred and ninety of these powerful guns are to be manufactured, and their combined energy will be approximately 21,250,000 pounds. The projectile for these guns weighs 2,100 pounds, and the entire number will be capable of firing nearly 200 tons of projectiles at a time. To produce this result 125,000 pounds of powder would be burned in about one-twentieth of a second. A single discharge of these combined batteries, ordnance officers estimate, would produce energy equal to that required to lift a battleship to the height of the Washington Monument.

DEVELOPMENT OF THE 16-INCH NAVAL GUN.

The question of increased size of naval artillery for capital ships is one which, of course, is subject to continual discussion and development in the Navy. The 14-inch gun having proved a success, plans were initiated to develop a 16-inch gun. These plans were brought to a fruition on September 30, 1914, when the first 16-inch 45-caliber gun was proved. A few minor changes were made in the designs,

and it was re-proved in May, 1916. This gun was so successful that it was decided to install it on battleships 45, 46, 47, and 48.

The 16-inch 45-caliber gun having proven so successful, further plans were made to increase the power of this gun by increasing its length to 50 calibers, and on April 8, 1918, the first 16-inch 50-caliber gun was proved. Again were the designs successful, and it was immediately decided to arm the recently authorized battle cruisers and battleships 49 to 54 with these guns.

GREATER ACCURACY AS WELL AS EFFECT.

It is interesting to note the reasons for an advance in power in naval artillery. As the size and weight of the projectile increases, the more accurate becomes the trajectory, so that with increase in power, greater probability of hitting is secured. It is found also that the smashing effect of a large heavy shell, one that overmatches in caliber the thickness of the armor, has proven to be much greater in service than any calculations by mathematical formulæ indicate.

The increase in size of the gun provides such a large increase in power that some slight decrease in muzzle velocity may be permitted, and the decrease in muzzle velocity materially reduces the destructive effect of erosion. It may be said in general terms, therefore, that the 16-inch 50-caliber gun is not only of greater power than the 14-inch, but probably also possesses a longer life. The muzzle energy of the 16-inch 45-caliber gun is approximately 100,000 foot-tons, which in the 50-caliber is increased to 115,000 foot-tons.

The success in France of the 14-inch naval guns on railway mounts, the equipment of our dreadnaughts with huge guns, manufactured at the Naval Gun Factory and tested on the naval proving grounds, attest the accomplishments of the Navy in the production of guns of the largest caliber and greatest range.

METHODS OF MAKING GUNS IMPROVED.

With the notable development in making guns, there has been a marked improvement in methods. High-power guns had their inception during the Civil War when an American Army officer, Capt. Rodman, produced a cast-iron gun of extraordinary power by cooling the interior of a molten gun, and maintaining this difference in temperature throughout solidification. This was based on the principle of initial compression on the interior portion and initial tension on the exterior portion. The shrinking of a wrought-iron band around the breech was the next step, and this was the real beginning of modern gun construction. With the advance in the art of casting and forging steel came increase in the size of cannon until the modern 16-inch gun, about 70 feet long, represents the highest stage of the art so far realized.

STRENGTH COMBINED WITH LIGHT WEIGHT.

And now we are adopting the principle developed by Rodman to cold metal, substituting for the internal pressures created by the different temperatures of successive increments, an internal hydraulic pressure. This pressure has been run up to about 100,000 pounds to the square inch, and under such a pressure the interior layers or increments of the cold forging are compressed and the exterior increments stretched. With the withdrawal of the pressure the gun is left in the strained condition, when fired the strain of firing is communicated to all layers equally, and enhanced strength results.

This process eliminates an enormous amount of machine work in gun construction, for the gun is made in one piece, and on account of its greater strength makes a lighter gun for the same power. Guns up to 4 or 5 inches have been made by this new process, and these, in spite of their smaller weight and cheaper construction, are as accurate and long-lived as the other type. So far we have not succeeded in applying this method of construction to the larger guns, but this application may be expected as the art develops.

ORDNANCE PRODUCTION—ECONOMY AND PROGRESS.

With the signing of the armistice, when ordnance production was at its height, supplying vast quantities of munitions sufficient to meet present and future demands, came the task of slowing down the war machine. This called for prompt and wise action. The many thousands of mines required for the North Sea barrage had been made and laid, and we were preparing the mines for the barrage in the Adriatic and Ægean seas projected by the Allied Naval Council. We were preparing to furnish 50 more 14-inch railway batteries, the most powerful in existence, for service on the western front, the five already in action having proved the most effective long-range artillery in use by the Allies. These batteries would have been capable of dropping 60 tons—120,000 pounds—of steel projectiles and high explosives on enemy positions in a single minute of firing. Depth-bombs had been increased from the 50-pound charge used early in the war to a standard size carrying 300 pounds of T. N. T., and we were beginning the manufacture, in numbers, of the latest design, a huge bomb containing 600 pounds of explosives. We were producing seven-inch guns on tractor mounts, and twenty of these, for the Marines, were completed and awaiting transportation to France.

Torpedoes in unprecedented numbers and other naval engines of war were being constructed more rapidly than they could be transported, for naval ordnance was being produced for both land and sea warfare.

\$100,000,000 IN CONTRACTS CANCELED IN ONE WEEK.

Steps were taken in November to shut off full steam, contracts were annulled or amortized, and in a short time the wheels moved more slowly. This was not easy, but cooperation of manufacturers made it less difficult, contractors showing a spirit of gratifying reasonableness. Savings of over \$100,000,000 were effected in one week; and \$62,000,000 more in the next month. Salvaging of equipment and supplies in ordnance materials has resulted in large saving to taxpayers, and has been carried out with justice to all.

ARMOR PLANT BEING PUSHED TO COMPLETION.

With the let-up in production of war weapons, our ordnance experts have turned their energies to the completion of the armor-plate plant at Charleston, W. Va., where, before a great while, the Navy can make the armor for its ships and conduct experiments for improvements which were not possible when our sole dependence was upon private makers of armor.

This plant is to be the model steel works of the country and will have an annual capacity of 20,000 tons of armor plate, 10,000 tons of large gun forgings, and 10,000 tons of major-caliber armor-piercing projectiles, with an additional capacity to produce many of the high quality forgings which are required in modern gun construction. Experience in building destroyers during the war demonstrated that probably the most difficult material to secure from private plants was the enormous steel forgings which are the backbone of ship construction, and the Charleston plant will be equipped to produce these, as well as ordnance forgings.

NEW TORPEDO FACTORY—OTHER PLANTS ENLARGED.

In the new torpedo plant at Alexandria, added to the facilities of the torpedo plant at Newport, the Navy can manufacture the bulk of the torpedoes that will be required for its hundreds of destroyers and many submarines. The new proving grounds on the Potomac, the new mine storage depot at Yorktown, the increase in the gun factory at Washington, enlargement of the torpedo factory at Newport and other ordnance extensions will find the Navy well prepared to produce the bulk of its ordnance needs.

NAVY YARDS AND BASES ON THE PACIFIC.

In 1916, with the view to proper naval establishments on the Pacific coast, a commission of able naval officers was appointed under direction of Congress to make a study of the navy yards on the Pacific and to make recommendations for new yards and such enlargements of

the old ones as naval expansion and protection of the Pacific States might require. An exhaustive study of all the bases and harbors of the Pacific was made by a board, known as the Helm Board, and the results and recommendations forwarded to Congress shortly before the United States entered the World War. Action on the report was necessarily postponed until the conclusion of the war. The report is not only an exhaustive study of facilities and opportunities on the entire seacoast, but it contains a mass of information upon the rivers, harbors, and channels. It also points out what should be done in harbor improvements as well as in naval development.

EXPERTS MADE CAREFUL INVESTIGATION.

In view of the organization of a great Pacific Fleet, more than twice as large in tonnage and in every other particular than the fleet which Admiral Evans took around the world in 1907, the importance of deep harbors and large navy yards and naval bases is more realized and emphasized than formerly. In August I joined the new Pacific Fleet at San Diego and, with able naval experts, made a personal visit and study of all the suggested possible sites for naval purposes from the Mexican to the Canadian border and Hawaii. The experts, who accompanied me and made the trip and made careful investigation, were Rear Admiral J. S. McKean, acting chief of Operations; Rear Admiral C. W. Parks, chief of the Bureau of Yards and Docks, and Commander J. C. Hilton, of the Bureau of Supplies and Accounts, an expert in the supply and storage of fuel oil and other naval supplies. Commander P. W. Foote was also a member of the party. The report of these able officers—interesting, instructive, and of most practical value—will repay a careful reading and consideration. It is published as Appendix D in this report.

BEGINNING SHOULD BE MADE NOW.

In the annual estimates submitted to Congress I have followed, in a measure, the recommendations of the Helm Board and the McKean committee asking at this time only for the appropriations needed for the construction and enlargement of naval bases most needed on the Pacific. Generous cities have tendered the gift of valuable sites in some of the places recommended. I can not too strongly urge that Congress at the coming session will make a large beginning in the development of shore bases and navy yards and air stations on the Pacific. Very little money has been spent on that coast and the time has now come when the enlargement of the fleet makes large expansion necessary for its proper care.

NEW DRY DOCKS OPENED.

The enlarged Navy and the greatly increased merchant marine have taught us the vital need of sufficient dry docks to receive the largest dreadnaughts and the biggest ocean liners. The war showed the acuteness of this prime necessity, too long neglected. When the *Vaterland*, renamed the *Leviathan*, was taken over to transport soldiers to France, the country was rather startled to find that there was not a dry dock in the United States large enough for that big liner.

NORFOLK AND BOSTON DOCKS COMPLETED.

It is true the Navy was building one at the Norfolk Navy Yard of sufficient proportions, but it was not ready, though work had begun before the war and it was being rushed to completion. Opened in April, this dock is 1,011 feet long, 144 feet wide at coping, and 40 feet deep. It cost \$4,500,000 and will accommodate any ship that can pass through the Panama Canal. It was true also that the Commonwealth of Massachusetts, with large vision, was completing a dry dock 1,176 feet long and 149 feet wide at coping. But it was far from ready. Later, by authority from Congress, the Navy purchased and completed it, providing accommodation for the largest naval and commercial ships. The largest of all our docks, it is a naval and commercial asset of the first importance. Operated as a part of the Naval Establishment, it will be a blessing not only to Massachusetts but to the whole Navy and particularly to all New England shipping.

AT PHILADELPHIA AND CHARLESTON NAVY YARDS.

A large dock is building at the Philadelphia Navy Yard, a replica of the Norfolk dock, and work will be begun shortly on the dock at the Charleston Navy Yard, on the Atlantic. Before the war, the Navy made possible the construction by a private corporation of a big dock at Hunters Point in San Francisco Harbor, which was of the highest value upon the arrival of the Pacific Fleet in that splendid harbor. It is 1,007 feet long, 153 feet wide at coping, and 37½ feet deep. A great dry dock at Panama had been provided when the canal was dug.

Work will shortly be pushed on the Charleston dock. At present there is no dry dock south of Hatteras—not one between Norfolk and Panama. The need, in this stretch of 1,740 miles, of a dock big enough to take the largest dreadnaughts, has long been felt. We have four great Navy dry docks north of treacherous Hatteras, and not one south of Hatteras. Congress directed the War Department to deepen the channel at the Charleston Harbor and at the same time appropriated \$4,000,000 to construct a big dry dock, practically like the great docks at Boston, Norfolk, and Philadelphia.

TWO DRY DOCKS FOR MERCHANT SHIPPING AT NORFOLK.

The Shipping Board, in order to meet the need of merchant ships, financed the building of two dry docks in the Norfolk Navy Yard, adjacent to the modern machine shops of the Navy. On the 31st of October these docks were opened under the brightest auspices, when the Queen of the Belgians, who, with the King, on that day visited the navy yard, christened these two latest docks. It was an important occasion, and the many thousands of people present cheered when the Queen pressed the button and the docks were flooded.

GREAT PEARL HARBOR DOCK COMPLETED.

Of more than national significance was the completion of the dry dock at Pearl Harbor, in Hawaii, and its flooding on the 21st day of August, in the presence of many thousands of people and a distinguished company. The Spanish-American War taught the needs of a naval base in Hawaii, the crossroads and strategic and commercial center of the Pacific. A small naval station was first built and Congress authorized the construction of a graving dock 589 feet long. Later, as the ships became larger, and the Panama Canal indicated the probable limit of battleship length and width, the dock was increased to 1,002 feet long, 138 feet wide at coping, and $32\frac{1}{2}$ feet in effective depth. Work was begun and progress made in the construction until suddenly, on February 17, 1913, the country was startled to read that by seismic upheaval the Pearl Harbor Dry Dock had collapsed.

NEW PLANS AND METHODS OVERCAME DIFFICULTIES.

Distinguished engineers and geologists were engaged to make a study and report whether it was possible to build a permanent dry dock on that foundation. There was such difference of opinion that it was at one time contemplated to build a floating dock, notwithstanding its unsatisfactoriness and its cost of operation. But finally the joint study of half a dozen civil engineers of the Naval Establishment and civilians, working together, headed by the late Mr. Alfred Noble, devised a plan of construction which they thought would be successful. It was adopted by the department, Congress authorized the increased appropriation, and the contractors went to work to build upon the new plans. Would it succeed? That was the question often asked.

When, on August 21, 1919, the wife of the Secretary of the Navy pressed the button and the water flowed into the docks, and Rear Admiral Parks, head of the Civil Engineer Corps and Chief of the

Bureau of Yards and Docks, and Civil Engineer McKay, both of whom had had a large part in its construction, pronounced it fit and perfect, there went up a shout from the thousands of people present, and a feeling of thanksgiving from the hearts of those who had hoped and labored through the years of doubt.

A MONUMENT TO FAITH, ENGINEERING SKILL, AND EFFICIENCY.

It required 10 years for the finished work, and is a monument to faith, engineering skill, and efficiency in construction. Its construction was essential to naval operation in the Pacific in the day of mighty dreadnaughts. It is invaluable also to the increased and increasing fleets of merchant and passenger ships of our own and other nations which will, more and more, ply the Pacific. The opening of the Pearl Harbor Dry Dock must be followed by the expansion of the navy yard, coaling and oil plant, and other naval facilities in Hawaii, destined to be an important naval base.

NEW TYPE SHIPBUILDING DOCK AT PUGET SOUND.

A dock was completed on January 31, 1919, at Puget Sound, which is an innovation in American practice. This is a shipbuilding dock 936 feet long, 130 feet wide, and 18 feet deep. It affords ample space for the construction of two destroyers at one time. When building is completed, the dock is flooded, and the ships float from the blocks instead of being launched. The dock is served by two 20-ton hammerhead cranes, one on each side. The cost of the entire project was about \$600,000.

MANY IMPROVEMENTS IN NAVY YARDS.

A "yard development" program, improving navy yards for the construction of warships and more efficient industrial activities, was prosecuted throughout the term of the war, and is still going forward. The outlay of about \$27,000,000 has resulted in many new and important developments in the most important navy yards.

IMMENSE CRANE INSTALLED AT PHILADELPHIA.

At the Philadelphia Navy Yard a crane is being completed at the fitting-out slip, the capacity of which ranks among the largest ever built. Having a lifting power of 392 tons, it will be capable of handling larger assemblages of battleship machinery than have hitherto been installed as units. This crane is of the revolving hammerhead type, and stands 230 feet high, the height of a modern 16-story office building. The bottom chord of the revolving truss clears the

ground by 170 feet. An interesting detail of this gigantic piece of mechanism is that the operating house, 200 feet in the air, has a height equivalent to two stories, and is itself equipped with a 35-ton crane for handling the operating machinery. The contract for this crane was let on December 27, 1917, and work has proceeded steadily since that time.

FLOATING REVOLVING CRANE AT MARE ISLAND.

A floating revolving crane of unusual capacity was put into service at the Mare Island Navy Yard during 1919. It is used for ship-building, repair, and fitting-out purposes, and is capable of handling a 150-ton load at an overhang of 62½ feet from the side of the pontoon. The elevation of the hook under such conditions is nearly 100 feet, so that the crane is capable of handling extremely heavy loads, revolving them to position, and stowing them aboard ships of the highest freeboard. The maximum upward reach of the jib is approximately 200 feet. The machinery was furnished at a contract cost of \$480,000, and the pontoon was manufactured and machinery installed by the yard force. The Navy possesses an almost exactly similar crane at Norfolk, and few floating cranes are known either in this country or abroad which exceed these two in capacity or general utility.

STORAGE FACILITIES AT FLEET BASES.

Storage projects of huge proportions were constructed during the war. A fleet supply base at Brooklyn was erected at a speed of 10,000 square feet per day, was completed well ahead of the armistice, and met the requirements of all naval and transport and cargo operations in the northern Atlantic during the war and in the period of great demands after the armistice. It embraces two storehouses eight stories high, 700 feet long by 200 feet wide; two warehouses of a combined floor capacity of 235,000 square feet; a 3,000-horsepower power house—all built of reinforced concrete; 10 miles of railway, and two float bridges.

The storehouses and other improvements now building at the naval operating base at Hampton Roads, Va., will provide extensive storage and supply facilities which are possessed by few naval bases in the world.

PERSONNEL—DEMOBILIZATION AND RECRUITING.

There were half a million enlisted men and more than 32,500 officers on active service in the Navy and Naval Reserve Force when

hostilities ended in November, 1918, and it has been a difficult problem to release from active duty, as rapidly as was desired, men anxious for discharge, and at the same time retain enough to man the ships it was necessary to keep in operation.

The great task imposed on the Bureau of Navigation during the war did not end on November 11, 1918. The duty only changed. Demobilization and preservation of records, recruiting, and other of its functions have been and are most important. I recommend that the name of this bureau be changed to the Personnel Bureau, and that its duties be confined to the personnel. The present name is a misnomer. When the term Navigation Bureau was chosen it was a fitting designation. Then operation and the personnel for operation were united under the Bureau of Navigation. Now Navigation has no duty with reference to navigation except to supply the officers and men, and, the reason for the name having ceased, I recommend that it be given a title truly descriptive of its functions in the present-day Navy. When the Navy was small, efficiency was promoted by orders to ships and orders to men coming from the same bureau. To-day it is necessary for the Office of Naval Operations to have a large force to direct the operations of the fleets and ships and kindred duties, and the personnel has grown so large that it likewise requires a large staff of officers and clerks to direct the command and manning of the ships.

MANY CREWS REQUIRED TO MAN TRANSPORTS.

Bringing home the troops of the American Expeditionary Force required more transports than were utilized in taking them to Europe, less foreign tonnage being available, and these transports had to be manned and operated by the Navy. Navy-manned cargo ships had to be kept in service for months to carry supplies to Europe, many of them transporting cargoes shipped by the United States Food Administration for relief of the civilian population of European countries, others supplying our forces remaining abroad and bringing back war material and equipment returned to America. Of equal importance was the necessity of keeping on the fighting ships crews sufficient to meet any situation that might arise.

PROGRESS OF DEMOBILIZATION.

But despite these requirements demobilization has been rapidly accomplished, as is shown by the following table of men discharged from service or released from active duty from November 11, 1918, to November 1, 1919:

	Regular Navy.	Naval Reserve Force
Nov. 11-30, 1918.....	972	172
December, 1918.....	5,307	24,814
January, 1919.....	8,239	51,866
February, 1919.....	11,587	37,610
March, 1919.....	8,026	24,522
April, 1919.....	3,498	15,588
May, 1919.....	2,570	23,522
June, 1919.....	6,462	32,029
July, 1919.....	10,499	20,485
August, 1919.....	24,023	25,833
September, 1919.....	25,879	17,550
October, 1919.....	17,983	12,639
Total.....	125,045	286,630

OVER 440,000 MEN AND OFFICERS RELEASED IN A YEAR.

Of the total of 30,835 commissioned and warrant officers in the Naval Reserve Force, 29,026 had been released by November 1, 1919, only 1,809 remaining on active duty, these being released daily as their services can be dispensed with. While there were only 20,811 reserve officers on active duty November 11, 1918, about 9,000 were under instruction at officer material schools and other institutions, and these were, on completion of their training, given commissions or warrants and released to inactive duty. Of the Regular Navy, 2,006 resignations of temporary officers and 195 of permanent officers have been accepted.

Thus, in a little less than a year, 411,675 enlisted men had been discharged or released from active duty, and 31,227 officers' resignations had been accepted.

ELEMENTS THAT HAD TO BE CONSIDERED.

In demobilization the following elements had to be considered:

1. *Members of the Naval Reserve Force on active duty.*—These were liable for duty under the law only during the continuance of the national emergency. Presumably the emergency would be at an end with the ratification of the peace treaty. But the peace treaty has not been ratified and there remain less than 5,000 reservists on active duty out of a total of nearly 300,000. These men were placed on inactive duty instead of being disenrolled or discharged from the Naval Reserve Force, as it is not desired to sever them from the Reserve.

2. *Members of the Regular Navy who had enlisted for the duration of the war only.*—Of these, there were about 45,000 who had enlisted after January 11, 1918.

3. *Members of the Regular Navy who had voluntarily enlisted for the first time for the regular four years or minority enlistments at a date subsequent to April 6, 1917.*—Strictly speaking, these men could be held until the completion of their full term of enlistment, but it

was believed unjust to require this, for most of them had enlisted from the highest motives of patriotism for war service only and had signed for four years only because they thought they had no other choice. Under the law, they could be discharged by special order of the Secretary of the Navy but could not be given an honorable discharge. A special provision, retroactive, was contained in the act of July 11, 1919, giving honorable discharges to such men who were otherwise eligible.

JUSTICE TO MEN OF REGULAR NAVY.

4. *Members of the Regular Navy of the same description as in the preceding paragraph who had enlisted between February 3, 1917, and April 6, 1917.*—During the progress through the Senate of the naval appropriation act for 1920, it was pointed out that the rush of enlistments had begun when we broke off diplomatic relations with Germany, and that such men should be considered as war-service men quite as much as those who had waited until war was declared before enlisting. When this feature was embodied in the law, the department included these men with those of the preceding categories, as specified in earlier orders.

5. *Members of the Regular Navy whose enlistments had expired during the war and who had immediately reenlisted from patriotic motives.*—While some of these men might have reenlisted in any event, a great many certainly would not have done so, particularly in view of the opportunities for employment at larger pay in civilian pursuits ashore or in the merchant marine. The Navy owed quite as much consideration to these men as it did to any of the preceding categories and in justice had to treat them all alike.

6. *Men who had enlisted under a provision of the act of August 29, 1916, which was repealed March 3, 1917, whereby they could be discharged after a year's service, in December and June.*—Owing to the war, no one had ever been discharged under this provision.

Among other factors in which men of all the foregoing categories were involved which were especially considered were: Those who desired release in order to continue their education; those who had dependents whom they could not satisfactorily support on the Navy wage; and those who had jobs held open for them in essential industries, or were urgently needed in their business.

SUCCESSIVE STEPS IN DEMOBILIZATION.

On November 21, 1918, an order was issued authorizing the release of 20 per cent of the total number of naval reservists plus duration of war men, except in certain ratings in which there were shortages:

followed on November 29 by authorization of the release of 10 per cent of men enlisted for first time between April 6, 1917, and January 1, 1918. On December 13 all ratings were included except Hospital Corps men and radio electricians, and it was announced that 5 per cent per month of these two ratings would be released.

On January 6, 1919, release was authorized of 20 per cent Naval Reserve Force, 20 per cent duration-of-war men, 10 per cent of men first enlisted between April 6, 1917, and January 1, 1918, and 5 per cent of Hospital Corps men; these percentages to be based on numbers remaining after previous quotas had been let go. All restrictions in ratings were removed, except as to Hospital Corps men. On and after February 20 commanding officers were allowed to release 3 per cent per month in excess of authorized quotas to meet urgent cases. Instructions were issued to commandants to reduce the number of men ashore by transfer to sea duty, and quotas of releases from sea-going ships were increased, on May 7, to 6 per cent for May and June, this with a view to having total personnel reduced to 250,000 by July 1. On June 5 commandants and commanding officers were directed to reduce by 10 per cent the enlisted personnel under their command.

VOLUNTARY TRANSFER TO NAVY AUTHORIZED.

The naval appropriation act of July 11, 1919, authorized the voluntary transfer to the regular Navy, with accompanying benefits, of men who would otherwise be eligible for release, and made the initial date of what may be termed "war service" enlistments February 3, 1917, and this date, instead of April 6, 1917, was used in subsequent instructions issued.

An order was issued July 23 directing release, as rapidly as the clerical work involved would permit, of all naval reservists, duration-of-war men, and also those who had enlisted or reenlisted for four years between February 3, 1917, and November 11, 1918, and had changed their enlistment to "duration of war status," who would not avail themselves of the benefits provided by the new naval act. Vessels of the transport force were exempted. Clerical forces were to be maintained at sufficient strength to expedite handling of demobilization. Commanding officers were authorized to release 20 per cent of the Hospital Corps men during August, September, and October, except those serving abroad, where 6 per cent of releases were authorized, and in addition any who could be spared without relief, and on September 29 this was extended to all who could be spared. On October 7 instructions were extended so as to direct release of all enlisted men, on their written request, who would not

take advantage of benefits to join the regular service nor agree to continue their present status of service until released in the future.

PAYING BONUS AND TRAVEL ALLOWANCE.

The act of February 24, 1919, granting a \$60 bonus to all men honorably discharged or released and the act of February 28, 1919, granting 5 cents per mile travel allowance, both retroactive, introduced additional problems in demobilization. To meet this and other requirements, seven of the more important recruiting stations in the interior of the country were specified as additional demobilization stations. Such numbers of men were being released or discharged at the seaboard cities as to cause great congestion and it was desired to increase the demobilization points.

Duration-of-war men were not allowed transportation under previous law. So many men were stranded in New York that the Bureau of Navigation, through its transportation section, opened a temporary office in that city, for the purpose of getting these men to their homes. This office provided transportation, and instructed the men how to secure the balance due them of the 5-cent-per-mile allowance. It also paid the \$60 bonus to a number of men. In all, about 3,000 were handled at this office.

MANY TEMPORARY OFFICERS RESIGN.

In demobilizing enlisted personnel the Bureau of Navigation specified only numbers to be released, leaving the selection of individuals to the commanding officers. The resignations of officers were handled individually by the bureau by travel and release orders. Officers, as a rule, were not so anxious to be demobilized as were enlisted men. Generally speaking, the pressure brought to bear upon the bureau has been, in the case of men, to get them released; in the case of officers, to retain them on active duty. As the status of permanent officers of the Regular Navy was not involved, those who figured in demobilization were temporary officers of the Regular Navy and officers of the Naval Reserve Force.

The temporary officers were appointed principally from three sources: 1, warrant and chief warrant officers of the Navy; 2, enlisted men; 3, from various classes of the Naval Reserve Force. Groups 1 and 2 are still nearly all on active duty in the temporary ranks attained by them during the war. From group 3 came many requests for release, presented as resignations. Up to November 1 the following resignations from the Regular Navy had been accepted:

	Temporary.	Permanent.
Line.....	1,562	2
Medical Corps.....	181	131
Supply Corps.....	20	57
Construction Corps.....	7	5
Chaplains.....	6	.....
Civil engineers.....	3	.....
Warrant officers.....	227	.....
Total.....	2,006	195

RESIGNATIONS AND COMPENSATION.

Quite a number of commissioned officers have resigned, a few warrant officers, and many petty officers. The latter, upon whose efficiency so much depends, have been offered very greatly increased pay on shore or in the merchant marine, and, though they preferred the Navy, duty to their families compelled them to separate themselves from the service. To a lesser degree the same compulsion has caused commissioned officers to resign. While a large number received temporary promotions during the war, carrying with it increased compensation, there has actually been no increase in the pay of officers since 1908. The necessity of separation from home, frequent changes of duty involving heavy expense, and the high cost of living have borne heavily upon the officers who have no means of support except their pay and allowances. They are unable to think of, much less engage in, any gainful pursuit.

I have earnestly recommended to Congress a continuance of the commutation allowed to officers afloat during the war and a graded increase in pay, particularly to officers in the ranks where the yearly pay is not large. The present high prices make such increase necessary, and I hope it will be speedily granted both as a recognition of the high efficiency and because it will enable the officers to continue their strenuous duties without the self-denial to their families which the present conditions have imposed.

NAVAL RESERVE OFFICERS RELEASED.

For approximately four months following the cessation of hostilities reserve officers were released upon their own application as rapidly as the necessary orders could be prepared. After that period it became necessary in many cases for the department to take the initiative and release those officers whose services could well be spared. The naval appropriation bill, approved July 11, 1919, fixed the number of commissioned reservists employed on active duty for definite periods, and reserve officers whose services were not absolutely necessary or could be spared without serious harm to naval activities were released.

RESERVES PROVE THEIR WORTH.

Congress should make ample provision for retaining and strengthening the Naval Reserve. We could not have manned the ships and carried on the war without them. They deserve the warmest praise and commendation. Many of them demonstrated leadership and ability of a high order, were placed in responsible positions afloat and ashore, and were animated by the true Navy spirit of giving the best service.

RECRUITING CAMPAIGN PROVING SUCCESSFUL.

Second only to the efforts to release the men who wished to get out of the service have been the efforts to get men into the Navy. With the first steps of demobilization came the realization that, unless active measures were taken to build up the personnel, it would fall below the strength required to keep our ships in proper condition. After the passage of the universal service law extending the age limits of 21 to 31 to 18 to 45, the Navy ceased recruiting and secured its recruits by induction through the draft boards.

On December 2, 1918, the President authorized the resumption of voluntary enlistments for the Navy, and on the following day an order was issued restoring its recruiting stations and districts, and directing resumption of enlistments. The former recruiting offices had not been closed but had been used as mobilization points for receiving inducted men.

STATIONS IN EVERY PART OF THE COUNTRY.

In the recruiting campaign many additional subrecruiting stations were opened up. At the present time there are 5 main and 17 substations in the New England district, with headquarters at Boston; 13 main and 62 substations in the eastern district, with headquarters at New York; 5 main and 33 substations in the southeastern district, with headquarters at Atlanta; 7 main and 40 substations in the central district, with headquarters at Chicago; 6 main and 33 substations in the west central district, with headquarters at Omaha; 6 main and 35 substations in the southern district, with headquarters at New Orleans; and 7 main and 47 substations in the western district, with headquarters at San Francisco.

SHIPS IN PORT AUTHORIZED TO RECRUIT DIRECT.

In addition to the work of the recruiting stations, extraordinary measures have been adopted. Ships in port have been authorized to enlist recruits and to retain such men on board for training and duty and have been directed to furnish recruiting parties to co

operate with local recruiting stations. Recruits so obtained have been sent to the ship concerned. One dreadnaught, the *North Dakota*, added to its personnel 456 men which were recruited by its own officers and men, setting an example for all ships in the fleet.

ANTISUBMARINE BOATS AND AIRCRAFT SENT ON TOURS.

As the Navy in seeking recruits must compete to some extent with the demand for men in civilian employments, it has been necessary to use special efforts to stimulate recruiting. An antisubmarine flotilla, which included patrol boats and aircraft, was sent up the Mississippi River and tributaries, and aroused great interest in that region. The seaplane *NC-4*, which made the trans-Atlantic flight, was sent on a tour of ports on the Atlantic and Gulf coasts. A recruiting train was sent through the Middle West, and naval exhibits were sent on a tour of leading State fairs.

A newspaper advertising campaign has been begun involving \$300,000, and wide publicity has been secured through the public press, moving pictures, posters and booklets and articles describing life in the Navy. A special school has been established for the training of recruiting personnel.

60,000 RECRUITS SECURED—MANY REENLISTMENTS.

As a result of these efforts, some 60,000 recruits have been enlisted, approximately 2,000 reservists transferred to the regular Navy, there have been nearly 13,000 reenlistments, and some 17,718 enlistments have been extended. Recruiting was resumed December 3, 1918, and in that month there were 1,684 first enlistments and 757 reenlistments. The progress of Navy recruiting during the present year, to November 1, is shown in the table below:

Month.	First enlistments.	Transfers from reserve.	Reenlistments.	Total.	Extensions of enlistments.	Grand total.
January.....	5,067		956	6,023	20	6,043
February.....	5,730		697	6,427	27	6,454
March.....	5,819		605	6,424	48	6,472
April.....	6,242		650	6,892	18	6,910
May.....	5,677		711	6,388	31	6,419
June.....	4,482		607	5,089	17	5,106
July.....	6,939	147	1,026	8,112	7,460	25,269
August.....	6,434	645	2,618	9,697		
September.....	5,980	585	2,353	8,918	6,936	15,854
October.....	5,970	612	1,782	8,364	3,161	11,525
Totals.....	58,340	1,989	12,005	72,334	17,718	90,052

SERVICE APPEALS PARTICULARLY TO YOUNG MEN.

Considering the difficult task placed before the recruiting service, the performance of the last few months has been very satisfactory and should continue so.

The Naval Service seems, at the present time, to appeal particularly to very young men, and most of the recruits obtained are just over the minimum age limit. Although these men are inexperienced, there is no doubt that with proper training they will develop into excellent men-o'-war-men.

PERMANENT TRAINING SCHOOLS.

During the war three of the permanent training stations were greatly expanded to meet present and future needs. Through them and the other stations there passed not less than 200,000 young Americans, who were taught the first rudiments which stood them well in hand when they later saw service afloat. These schools at Chicago, Norfolk, and Newport are much too large for present needs. The buildings not now in use are being preserved, ready for the occupancy of reserves who will be invited to take short courses of training each summer. For this purpose the excess in housing will be well utilized and will constitute an asset.

In these three and the other permanent training station at Yerba Buena, San Francisco Harbor, and in the temporary stations, a few still in operation, there are schools which give educational advantages to all young men who enlist in the Navy. They are taught arithmetic, reading, geography, grammar, and prepared for Naval Academy examinations. Instruction is given in every trade and occupation in the Navy, in aviation and mechanics and kindred subjects as well as in ordnance and aviation, pharmacy, stenography, nursing, cooking—in fact, in every branch of naval knowledge.

These schools are excellent, and many youths have emerged from this four or five months of instruction with a new capacity to learn and new ambition and better ability to do their part in making a better Navy. Education in the Navy is the first and last word—education called theoretical, and practical education. Youths denied the opportunity of education in civilian life can, by earnest application, increase their education in the Navy while earning their living. With increased knowledge and capacity comes advancement with larger pay, and there is no limit to advancement for youths of purpose and good minds.

2,086 MIDSHIPMEN AT NAVAL ACADEMY.

The Naval Academy, now that the additions to Bancroft Hall have been completed and occupied, gives accommodation to more than 2,000 midshipmen, and 2,086 were present at the opening of the fall session. Of these 709 were new men, making up the largest fourth class in the history of the Academy. The new wings of Bancroft Hall are of the same material and architecture as the original

building, and as completed this large and magnificent structure is dignified, stately, and ideally constructed for its uses. There were 460 graduates in the class who received their diplomas last June, whereas the number was 182 in the year preceding the war. The need for officers was foreseen before war was declared, and the course reduced from four to three years. The full four-year course has now been restored.

YEAR'S SERVICE IN RANKS WOULD BETTER FIT FOR COMMAND.

Now that the close of war lessens the pressing demand for officers it may be possible to carry out a policy long considered of increasing the course to five years, one year to be spent afloat as an enlisted man to learn the practical lessons below decks, which would be invaluable to every officer. No officer can command so well as the man of ability and knowledge who knows every character of service, from polishing the brass on board ship to the highest strategy and tactics.

FORMER ENLISTED MAN LED CLASS OF 1919.

The careers of the midshipmen who were appointed from the ranks has more than justified this departure from the old policy. The star graduate in the class of 1919 obtained his appointment by merit from the enlisted ranks. Other things being equal, such experience helps in the making of an officer. Fewer enlisted men have secured appointments as midshipmen than was expected because the stress and rigorous service of war left little or no time for study and preparation. Opportunity for instruction for ambitious youths in the service is now given to all who make application to stand the entrance examination.

FAVORS COMPETITIVE SYSTEM IN CONGRESSIONAL APPOINTMENTS.

The Board of Visitors in its valuable report (see Appendix K) reaffirms its recommendation that examinations for admission in the several congressional districts be by competitive examination, rather than by appointment without competition, by Senators and Representatives. They truly declare the competitive method "more democratic than the one now commonly practiced" and are convinced that it "would provide better candidates." In both respects they are eminently right.

One of the objections to the present system is that too large a number of young men solicit and obtain appointment primarily for the purpose of obtaining the excellent education which the Academy affords. Some of these youths have no love for the sea, no taste for the naval profession, and lack that zeal and enthusiasm for the life which is necessary for the highest attainment.

Appointment from the ranks is the best and the most democratic method and assures the matriculation only of young men with zest for naval service. The day will come when all young men desirous of joining this noble profession will obtain appointment to the Academy only by graduation from the enlisted service. But if Congressmen feel that such a radical departure might deny equal representation to every district and every State, which is to be desired and ought not to be lost, provision could be made by which the representation could be divided among the States, as now.

If, however, Congress insists upon naming the midshipmen from their States or districts, I venture to urge that the appointment be made by competitive examination rather than by personal selection. Most Congressmen name fit and worthy young men, but those who leave the field open to all aspirants have been gratified by the results, and the naval authorities have found that it gives us better officer material. As a rule the youths who win solely by merit are better prepared and have more enthusiasm and zeal.

PRACTICE CRUISE ON BATTLESHIPS.

Until a whole year's service in practical service afloat can be put into practice, the policy of an annual summer practice cruise on battleships is carried out. The results are excellent. During the past summer the cruise with the midshipmen embraced a voyage in the West Indies, to Guantanamo, through the Panama Canal, up the New England Coast and to Hampton Roads for target practice. Six battleships under command of Rear Admiral Roger Welles made the cruise, and the training in seamanship, gunnery and the actual duties aboard ship constitute experience that helps greatly in making the young men ready for their later duties as officers afloat.

THE POST-GRADUATE SCHOOL.

The post-graduate school for officers, adjourned during the war, has been reopened at Annapolis in model quarters in the building originally erected for marine barracks. During the war this building was used for the instruction of reserve and young officers. Forty-eight officers have taken the course since the reopening and under the able direction of Capt. E. J. King and capable assistants it is a stimulating course which it would be well if every officer in the Navy could enjoy in the early years of his career. A naval officer must have more kinds of knowledge than a man in any other profession, and it is the purpose of this school to afford the rounding out of naval education and opportunity for specialization.

NEARLY 1,000 RESERVE OFFICERS TRAINED.

The Academy has not only graduated 1,040 officers for the Regular Navy since March, 1917, but it gave special instruction to five large classes of specially selected reserves who were thus enabled to speedily perform important duties during the war, some of whom demonstrated such naval efficiency that it is hoped they will become a part of the permanent naval force. The number of line officers graduated was 1,730, while 200 staff officers also became ensigns after duty and examination.

IMPROVEMENTS AND EXTENSIONS.

The most important improvement to the Naval Academy has been the completion of the two extensions to Bancroft Hall, each 387 feet long by 54 feet wide, and each having two subsidiary wings 87 feet long by 46 feet wide. Begun on July 30, 1917, work was entirely completed six months ago, at a total cost of \$3,925,000. They provide 574 additional rooms for midshipmen, 52 rooms for use as class rooms, offices, etc., and enlarged spaces for the laundry and tailor shop.

SEAMANSHIP AND NAVIGATION BUILDING.

To provide additional classrooms and lecture rooms and laboratories for the departments of seamanship and navigation, made necessary by the increased number of midshipmen, a building for use of these two departments is now under construction, which it is estimated will cost about \$750,000. The building adjoins the present gymnasium, is of reinforced concrete and granite 327 feet long by 68 feet wide, and of the same general type of architecture as the gymnasium and the midshipmen's quarters. Provision is made for 45 classrooms, lecture rooms, and rigging loft.

To provide additional classrooms, shops, and drafting-room space, an addition to the present Isherwood Hall was constructed at a cost of \$285,000; and extensions were also made to the forge shop and foundry. The new reinforced concrete sea wall was completed in September; the central power plant has been enlarged to supply the new buildings; new artesian wells provide abundant good water; there are new and adequate storage plants, with a new garage; and the material development of the plant has kept pace with the increase in the number of midshipmen.

HOUSES NEEDED FOR TEACHING FORCE.

The problem of housing grows more and more acute. The teaching force has necessarily been increased. It is not possible to secure houses in Annapolis, and the need for homes for the teaching force, officers,

and professors, calls for the construction of new houses. Millions have been spent for dormitories and classrooms and lecture halls, but adequate provision has not been made for the teaching and training personnel. While the proper rounding out of the site would make the acquisition of the city lots adjoining the chapel most desirable, there is sufficient land in the grounds of the Academy for the buildings needed to house the teachers and their families.

NEW CHAPEL WOULD BE FITTING WAR MEMORIAL.

The chapel, once large enough to seat all the midshipmen, is now much too small, and religious services are conducted in both the chapel and in Bancroft Hall. The day is not far distant when it will be the part of wisdom to erect a chapel large enough for all the midshipmen to worship together. It must be architecturally in keeping with the other structures, and when it is completed the present chapel, unsuited for religious services and unfit by reason of bad acoustics, should be converted into a memorial building and museum. Plans for such change are in preparation and will be ready when Congress indicates that it will make the necessary appropriation. It would be a fitting memorial in appreciation of the splendid sacrifice made by the officers and men of the Navy in the World War as well as in its entire history from the days of Barry and Jones.

STAMPING OUT HAZING IN ITS INCEPTION.

Early in the present session there came rumors of a recurrence of hazing, arising out of the fact that two midshipmen attempted to commit suicide, and an increased number tendered their resignations. Investigation proved that there was no hazing as that term is understood by the student body, but there still existed a species of hazing called "running," which was unauthorized and indefensible.

Rear Admiral Scales, the capable and wise superintendent of the Naval Academy, Commandant Cluverius, and other officers, who enjoy the confidence and esteem of the student body, have met with the hearty cooperation of the midshipmen in removing any cause for criticism. All the midshipmen of the three higher classes have signed assurances that no hazing, or running, or anything in the nature of assuming authority over the youths in the entering class would be practiced or tolerated. It was established that neither hazing nor running was responsible for the attempted suicides.

CAUSES OF NUMEROUS RESIGNATIONS.

The resignations were due mainly to the same causes that have produced unrest in all the world since the close of the war. Many young men, under the impulse of war fervor, entered the Academy,

wishing by naval training and naval service to serve their country. When the impulse of war service passed they found that they were better qualified for civilian occupations and wished to prepare themselves for some other profession.

There has been no hesitation in accepting the resignations tendered, with the approval of their parents, of such young men. They will be better citizens and more useful in a calling which they love than to continue in the Navy where they would do well but not do their best. It is easy to secure all the ambitious youths who have a genuine love for the sea without keeping those whose heart lies elsewhere. In other cases resignations have come from midshipmen who find it difficult or impossible to keep up with some branch of instruction. With more than 2,000 at the Academy, the acceptance of such resignations in their first year is best for the youths, best for the Navy, and best for the country.

A subcommittee of the House Committee on Naval Affairs visited the Naval Academy when there were reports of hazing, made an investigation, and came back with high commendation for the authorities and their spirit and action.

HAZERS WILL BE SUMMARILY DISMISSED.

Parents were gratified when the student body, of their own free will, honored themselves by guaranteeing freedom from hazing or running, or anything similar, at the Academy. Hazing in any form is indefensible when practiced in a civilian institution of learning. It is unthinkable and intolerable in an institution in which young men are received as potential officers, educated at the expense of the taxpayers, and whose first duty is obedience to authority. Without rendering this obedience to the laws of Congress, they are unfit to command, and it is better to have a few hundred men who are learning to obey in order that they may wisely command than 2,000 if that number embraces those who find pleasure in violating instructions and disobeying laws.

THE NAVAL WAR COLLEGE.

The only efficient naval officer is the student. From the day of entrance to retirement every successive promotion comes only after examination and selection of the fittest for the higher command. There is always the dual temptation to men of differing temperaments. The man who loves books and has a mind for study pursues this bent, sometimes making it paramount to the practical duties, becoming what in naval phraseology is termed a theoretical officer. The other type, who loves the salt and is immersed in navigation and engineering and making the machine go round, has before him the

temptation of not finding time to keep abreast with naval thought as found in the writings of naval statesmen. He becomes an old-fashioned sea dog, who can do anything on or with his ship, but lacks the wider knowledge that should be superimposed upon efficiency afloat.

MOST EXACTING OF PROFESSIONS.

The naval profession is more exacting than any other. The tendency in medicine, in law, in all professions is toward specialization. No longer does the physician do general practice. He confines himself to certain specialties or diseases. In the navy the officer must be equally skilled as a navigator, electrician, engineer, gunner, plotter, executive, and must be familiar with international law and usage, as well as be posted in the latest strategy and tactics of land as well as sea warfare. In most other navies the line officer is not expected to be an engineer, but with us the call is for the captain of a ship to have mastered all the trades before reaching command, and the policy is to assign every officer during his career to every character of duty so that in emergency he may go into the engine room or the electrical department and be as fully at home as when he navigates the ship and directs its whole activities. This demand requires intense application and varied experience, leaving little time for specialization deemed essential for the highest efficiency.

AT THE APEX OF NAVAL EDUCATION.

At the apex of naval education is the Naval War College at Newport, R. I. The need of such a course and such an institution had been long felt by the ablest officers in the Navy, led by the late Rear Admiral Stephen B. Luce, who became its first president upon its establishment, on a small scale, in 1884. Its instruction was then limited to three months in the summer, and only a few officers were enabled to take advantage of the course. Admiral Alfred T. Mahan, now recognized through his works as the world's authority on Sea Power, was invited to become a member of the staff of the infant college.

MAHAN SAW GREAT OPPORTUNITY FOR SERVICE.

In answer to the invitation, he wrote from the U. S. S. *Wachusett*, at Guayaquil, September 4, 1884:

I should like the position, like it probably very much. I believe I have the capacity and perhaps some inherited aptitude for the particular study; but I do not, on questioning myself, find that now I have the special, accurate knowledge that I should think necessary. I fear you give me credit for know-

ing more than I do, and having given a special attention to the subject, which I have not.

I take it the subject proposed to me involves an amount of historical narrative, especially directed toward showing the causes of failure and success, and thus enforcing certain general principles. Whether to this is to be added any attempt at evolving systems of tactics applicable to modern naval warfare, I don't understand; but I suppose by naval tactics you scarcely mean a reproduction of Parker. Taking simply the first subject, as I turn over in my mind the naval battles, and naval and mixed expeditions, scattered through history, and think how little I know about them in detail, the work assumes very great proportions. To look up the authorities, master them, and digest and arrange the material thus acquired, bring together examples illustrating the same lessons, above all the criticism, every one of these steps is big. Yet, if I rightly understand the subject, no less could be considered adequate treatment. And then how large a mass must be gone through and in the end found useless.

As to preparation here on board ship, it is impossible. I have looked through the ship's library and find little material and less that is first rate. I can go through it all in a few weeks. Besides, I should have to give my whole mind to the matter, which in command (of a ship) is impossible. No man is less able to serve two masters.

My reply to you, then, is "Yes"; I should like to come if, after reading my letter, you still wish it. Indeed, I don't think I would be right in refusing to help in a new, difficult, and most needful work if, in the judgment of others, I can be useful. Meantime * * * I will work up what is at hand as though the matter were settled.

THERE WROTE STANDARD WORKS ON SEA POWER.

It was the opportunity afforded at the college, where few officers matriculated, and therefore there was leisure for the task, that may be said to have given the world Admiral Mahan's works, which are everywhere regarded as the last word in naval lore. His books may properly be called a product of the War College in its early days. Their teachings have been of such value that it may be truly said they have more than repaid the country for the entire cost of this institution.

The successors of Luce and Mahan labored industriously to make the course at the War College as essential as a tour of duty ashore or afloat, but it was years afterwards before any naval administration adopted that idea; and, just as it was becoming a fixed policy, the new and imperative demands for emergency service compelled it to wait upon peace.

ADMIRAL SIMS RETURNS TO PRESIDENCY.

Soon after the signing of the armistice, when the main duties for which he had been sent abroad in 1917 were ending, Admiral William S. Sims was reassigned to the position of president of the War College. Shortly before the war, at the termination of sea service as commander of the destroyer flotilla and in command of the new

dreadnaught, the *Nevada*, Capt. Sims had been assigned to the presidency of the War College before he was promoted to rear admiral. He had the vision of an enlarged and greater place in the Navy for the college, which he was translating into actual reality when the war made it necessary for him temporarily to take up a service of the highest importance to this and the allied nations.

GENIUS IN INSPIRING YOUNG OFFICERS.

In addition to his ability and brilliant achievements he had shown a genius in inspiring and stimulating young officers of the Navy, and nowhere could he exercise this gift so as to touch the whole fleet as in leadership in the study of tactics and strategy at the War College. It was because of his deep interest in progress and advancement of naval officers that, upon completing his mission abroad, his preference was to take up the work he had laid aside for active war service. He therefore entered upon a second term as president of the college in the early summer of 1919.

The Bureau of Navigation was directed to send 30 officers to take a full year's course at the college and to select as members of the class men who had demonstrated qualities that indicated fitness for command. Another class of 30 enters on December 1, which will give an attendance of 60 officers, with 509 other officers taking the correspondence course. This is in marked contrast with the lack of interest felt in the college in 1911 when only four officers were assigned to take the year's course.

CORRESPONDENCE COURSE VALUABLE TO OFFICERS.

There is sound reason why every officer should take the correspondence course, preparatory to later taking a course at the college if opportunity offers, or, if denied the privilege of attending the institution, of keeping up with the large problems studied there. The War College does not fulfill its mission unless the results of its games and instruction reach the whole fleet, and to that end, while no compulsory orders require officers to take the correspondence course, every ambitious officer should do so. Other things being equal, the man who masters what is taught and learned at the War College is more fit for high command than he who fails to add that preparation to active experience and practical operation of ships or fleets.

WILL BE NECESSARY TO HIGH COMMAND.

The day will come, after full opportunity to receive this college instruction is within the reach of all, when one of the requisites to command of a battleship, division, squadron, or fleet will be a diploma of graduation at the War College. This does not imply that in this

period preference shall be given to men with such training over officers of great ability who have demonstrated leadership though not privileged to attend the college. But the day is near at hand when, with opportunity to take the course, the Service will recognize it as giving superior knowledge and fitness. Two of the admirals of the three fleets have attended the War College, as have all the vice admirals and a number of the rear admirals. In the attendance now are included younger rear admirals and captains of high rank, who recognize that before they go afloat in command they will be greatly helped by mastering the course.

TO FURTHER DEVELOP "SCHOOL OF THE FLEET."

Valuable as its work has been in the past, the Naval War College has never been given the place of importance it should occupy in the training of naval officers in the art of conducting a naval war. We spend years of time and millions of dollars in teaching officers the rudiments of their profession, in fitting them for the performance of their duties on board a particular ship, and in these "duties of the ship" the Navy has developed a high state of efficiency. In accuracy of hitting at long ranges in target practice, in economy and efficiency of our engineering performances, and in all the things which go to make a single ship an effective fighting machine, whether it be a submarine chaser or the latest dreadnaught, we have obtained results of which we may well be proud. But the study of the problems in connection with the many possible conditions that would exist in time of war or threatened attack, and practice in solving these problems have not kept pace with the study and solution of the problems arising in the single ship—in other words, the "School of the Fleet" has not advanced as far as the "School of the Ship."

JOINT ARMY AND NAVY COLLEGE SUGGESTED.

The higher study of war by Army and Navy officers is alike in so many respects that both should study the same strategy and tactics. One war college for both, with separate sections for land and sea strategy, would be of such value that I venture to suggest that Congress might wisely consider establishing such a joint institution.

TO MAKE "HAPPY SHIPS" AND CONTENTED MEN.

One of the most important developments of naval thought and activity during the past year has been the establishment of the Sixth Division, Bureau of Navigation, an organization which has to do solely with the welfare and morale of the officers and men of the Navy. The vital importance of the human element is recognized, and from the efforts of this organization, composed of carefully

selected naval officers and men, the desired result should be attained with economy and efficiency.

One of the greatest of sea fighters said, "A happy ship is an efficient ship," and it is to make "happy" ships and stations with resultant efficiency that this division was organized. The young sailor, deprived of the sheltering influences of home and thrown upon his own resources for the first time, is often bewildered upon his entry in what is, to him, a strange world. Unaccustomed to the routine of naval life, he sometimes finds difficulty in adjusting himself to conditions. When he is given leave, he may be inclined to throw off all restraint, forget the teachings of his home, and commit excesses which may harm him for life.

EXTENDS A HELPING HAND TO THE NEW RECRUIT.

It is necessary, therefore, that a helping hand be extended the recruit as he makes his entry into naval life; that he find a kindliness and personal interest shown him which approximates that of his own home; and that when he goes on liberty, the homes of the community be opened to him. As he grows older and leaves the training station for service at sea, he again enters upon a new world on board ship. A helping hand here, a word of advice, and he soon fits into the organization and becomes an efficient unit.

When he goes ashore he must be given a decent place to visit; he must be made welcome in the homes of the citizens whose safety he guards and the integrity of whose Government he upholds. When the ships sail for foreign lands, he should be instructed as to the things worth while to see in the ports he will visit; not only that he may avoid the pitfalls laid for the sailor's foot the world over but also that his mind may be broadened by viewing with understanding other peoples and countries, their daily life and their treasures of art and history.

PROMOTES ATHLETICS, FURNISHES DIVERSION, TEACHES SOCIAL HYGIENE.

At the fleet bases and navy yards he should be given opportunities for healthful recreation and the development of eye, brain, and hand in competitive athletics. In the evening, when the labors of the day are over, he should be given the pleasure of seeing plays and motion pictures. The young American is ambitious; the peculiar genius of his race expresses itself in a never-ending struggle to rise, to better himself, and a rational system of education should be supplied and so planned that opportunity to learn and to improve is constantly at hand. It is necessary that the importance of social hygiene be taught the sailor, young and old alike. Here must be impressed on him the striking truth of the saying, "The wages of sin is death."

ATTENTION TO SPIRITUAL SIDE OF LIFE.

Men can be given education, travel instruction, helpful advice, competitive athletics, entertainment, social-hygiene instruction, the homes of the communities can be open to them, their minds can be relieved of worry over their families; all these things can be done, but unless the uplifting influence of religious belief is given due place, the greatest good can never be attained. Attention to the spiritual as well as the physical and the mental side of life is vitally necessary if the personnel of the Naval Service is to reach its maximum efficiency.

It is, then, to give helpful advice in the stations and aboard ships; to provide and encourage athletics, motion pictures, travel instruction, social-hygiene instruction, and to stimulate the development of the spiritual life that the Sixth Division is organized. It draws around the men of the Navy a circle in which the good is made more attractive than the evil. There is no suspicion of coddling here; the right of the individual young American to choose his own course of action in life is inalienable. The Navy here gives him the opportunity; the decision rests with him.

REPRESENTATIVES IN DISTRICTS AND TRAINING STATIONS.

The Sixth Division is organized to replace, with officers and men of the Navy, the Commission on Training Camp Activities and its civilian personnel, who, working with other organizations, rendered such splendid service during the war and the period of demobilization. It is an organization in the Navy Department, acting under the Bureau of Navigation, composed of a chief of division and sections as follows: Organization of Communities, Home Service, Religion, Recreation, Education, Dramatic Entertainments, Motion Pictures, Athletics, Travel, Lectures, and Social Hygiene. In each of the more important naval districts, in the large training stations, and in the forces of the Marine Corps there is an officer of rank and experience whose duty is to aid the constituted authorities in maintaining a higher morale; that is, to aid in making the men and officers more contented and therefore more efficient. The value of this organization has already been demonstrated.

BOOKLETS AND LECTURES DESCRIBE PORTS FLEETS VISIT.

The Pacific Fleet on its cruise through the canal carried with it complete illustrated lectures on the construction of the canal, and each man was provided with a booklet which enabled him to understand his cruise. Plans are now under way to provide illustrated lectures on each of the important ports of the world, and to give

to every man going on liberty in these ports a small but comprehensive and instructive guide book which will enable him to get the most out of his visit.

In athletics it is the aim of the division to develop the man who is not naturally an athlete and who is therefore barred from competition for the ship's team. Athletic gear is furnished to these men and every encouragement given them to participate in athletic sports. Plans are under way to bind the men closer to their homes and to open the doors of the communities to them.

MEN IN CHINA AND NORTH SEA PROVIDED FOR.

The men on the upper Yangtze River, in China, 1,200 miles from the sea, are helped by means of a clubhouse which is maintained by the division. The sailors on our mine sweepers which have been removing the mines laid in the North Sea have been adequately supplied with comforts and entertainment. As the division is in close touch with the Office of Naval Operations, every ship which is commissioned or which sails for foreign ports is equipped in ample time. Every Marine regiment which goes to serve in the field is furnished a special outfit. In short, the division is a business-like organization by which the Navy Department expresses its interest in the welfare of the entire personnel, and by which it hopes to realize the ideals of the American people for every man in the Navy.

GRATITUDE TO WELFARE ORGANIZATIONS.

During the war, and in peace, too, the welfare organizations have rendered a service to the young men of the Navy of a value too great to be computed. For many years the Young Men's Christian Association at all cities where young men have been trained has made them welcome in its large and well-appointed and well-conducted buildings. During the war its good work was many times multiplied. In many places that young men gathered to train or to fight, since the beginning of the war, the Knights of Columbus have maintained homes for young men and been helpful in giving recreation, diversion, and have contributed to the betterment of the young men to whom they ministered. In like manner the Young Men's Hebrew Association, the Salvation Army, the Library Association, the Commission on Training Camp Activities, the Red Cross, and the churches of every creed have stimulated right living and been spiritual leaders.

VAST RADIO SYSTEM BUILT UP BY THE NAVY.

Radio communication, essential in time of peace and absolutely vital in war, has never had its importance so signally demonstrated

as in the past three years. If the enemy had succeeded in cutting the cables, radio would have furnished our only immediate means of communication with Europe. During the peace negotiations and the demobilization of our European forces, when the cables were overloaded, our transocean system transmitted millions of words of official dispatches and press reports, rendering a service which could not have been performed by any other means.

GOVERNMENT SHOULD CONTROL ALL RADIO.

The war taught the supreme necessity of quick communication and our dependence upon "wireless." The Government ought, through the Navy, to be in exclusive control of all radio. In war it was seen to be essential and the Navy was given the task, which it performed in a way to make the enemy spy system and enemy propaganda ineffective. You can operate a score of telephone or telegraph wires without interference, and from the standpoint of practical operation there is no argument for Government ownership. With wireless it is different. To secure the best results, indeed to secure good results, when wireless is largely used, the Government must be in exclusive control or it must make it a monopoly in private hands. No other plan, no divided authority, is thinkable in war. No other plan guarantees the greatest success in peace. The department has presented its view fully and clearly upon this question, the importance of which can not be too highly emphasized, in letters to Congress recommending a national policy. Its views are set out in full in these letters, printed in this report as Appendix E.

MILLIONS OF WORDS FLASHED OVERSEAS.

The Naval Communication Office has handled during the past year (estimated at an average of 60 words per dispatch) a total of 71,347,860 words, as follows:

By high-power radio (trans-Atlantic and continental)	16, 215, 423
By coastal radio.....	1, 621, 542
By leased wires, Western Union and Postal.....	53, 500, 895

EXTENDS AROUND MOST OF THE GLOBE.

During the war period the Navy developed a vast wireless service which enabled us to keep in touch with our ships in all parts of the world, maintained continuous and rapid communication between the United States and Europe, South America, Central America, the West Indies, the Hawaiian Islands, Guam, Tutuila and the Far East, as well as between our own Atlantic and Pacific coasts.

To direct movements of convoys and transmit information regarding the enemy and issue orders to naval vessels and merchant

ships, a comprehensive system of transmission from shore was organized, making it unnecessary, except in rare instances, for ships at sea to use their radio apparatus, thus avoiding the possibility of revealing their location to enemy submarines. All United States merchant vessels were provided with Navy operators, to the number of about 5,000, insuring efficient radio service aboard ships.

RADIO COMPASSES AID MERCHANT MARINE.

The system of radio compasses on shore, which was established originally for the detection of submarines, proved such a useful aid to navigation that during the past year additional stations have been constructed. This system, which in war enabled us, by determining the direction and distance of radio messages sent by enemy submarines, to ascertain their location at sea, enables us now to aid ships, in fog or cloudy weather, to determine their position, thereby adding to the safety of navigation.

HANDLED LARGE AMOUNT OF COMMERCIAL TRAFFIC.

Many naval shore radio stations were opened for ship-to-shore commercial traffic on November 15, 1918, all restrictions being removed except from ships in the Atlantic which were west of the fortieth meridian. Since that time all stations have been opened to this traffic and all restrictions removed, there being about 75 shore stations doing active commercial work.

The total earnings for commercial traffic during the past fiscal year amounted to approximately \$437,000. Of this amount there has been turned into the Treasury, under "Miscellaneous Revenues," \$236,210.50. The difference between the earnings and the amount turned into the Treasury, approximately \$200,000, represents the working cash balance of \$25,000 and balances due the Naval Communication Service from other lines and steamship companies.

REOPENED CIRCUIT TO JAPAN AND PHILIPPINES.

Owing to the congestion of the Pacific cables the Naval Communication Service reopened the trans-Pacific circuit to Japan and the Philippines on December 19, 1918. This service took the place of that inaugurated by the Marconi Co. about three months previous to the outbreak of war, the Navy carrying out the service between San Francisco, Pearl Harbor, and Japan. Owing to the large volume of Government business this traffic was restricted to full-rate business only. The earnings from this circuit up to June 30, 1919, were approximately \$188,000.

TELEGRAPH AND TELEPHONE SYSTEM.

At the time of the armistice the telegraph system of the Navy Department included wires from Galveston, Tex., to Bar Harbor, Me. The leased telephone wires of the Navy Department extended from Norfolk, Va., to Portsmouth, N. H. The telegraph office of the Navy Department was handling 4,000 messages per day, and the Navy telephone exchange 18,000 telephone calls daily.

In addition, this division had constructed or leased duplicate wires for distant control of all radio stations and for operation of a large number of radio compass stations. The Naval Communication office was also cooperating with cable censorship, furnishing technical advice and censoring the official messages of the cable companies. This service was rapidly reduced after the armistice, only enough wires and personnel being retained to handle absolutely necessary business.

UNIFIED REGULATION AND CONTROL A NECESSITY.

The chief lesson learned during the war was the necessity of unified regulation and control of radio, and of having the coastal system under the exclusive supervision of the Navy Department.

The Navy has, well established and in successful operation, a shore radio system capable of reaching ships at sea and establishing communication with all United States territories and foreign countries. Our transocean stations on the Atlantic easily communicate with England, France, Germany, and Italy; by means of the stations on the Pacific coast at Pearl Harbor, Hawaii, Guam, and Cavite, we are in easy and constant communication with the Philippines and Japan; our stations are located at strategic points in our own possessions from the Panama Canal Zone to Alaska.

The Navy actually owns 174 of the 233 radio stations in the United States and its possessions, only five high-power stations being under private ownership. The stations now owned and operated by the Navy include 5 transocean, 140 ship-to-shore, and 24 radio compass stations.

WOULD GIVE GOOD SERVICE AND PRODUCE LARGE REVENUES.

This radio system is of the greatest value to the Navy in time of peace, and absolutely vital to our operations in war. In addition it can be made of the highest usefulness to our merchant marine and commercial interests. It is capable of handling, in addition to naval communications, a considerable amount of other business, marine, commercial, and press dispatches. If this were done, charging only very moderate rates, the system would produce a large revenue and

could be operated at the highest efficiency at a nominal cost to the Government.

DAILY SHIPPING BULLETIN HAS WIDE CIRCULATION.

The Daily Shipping Bulletin, which is issued by the Naval Communication Office, has grown to a circulation of nearly 2,000 copies per day. Of its subscribers some 1,400 are commercial firms, such as shipping companies, marine underwriters, ship brokers, exporters and importers, and press associations. The Bulletin contains the names of 12,500 ships with news of their last movements, and the record of nationality, register, tonnage, and cargo. The popular demand for the Bulletin is growing daily and its success as a Government activity seems to be assured.

CODES, CIPHERS, AND SIGNAL BOOKS.

The Code and Signal Section has been engaged in the compilation of the United States Naval codes, ciphers, signal books, radio, and visual call publications. These have been distributed to all men-of-war, and during hostilities were also circulated to merchant ships. During the last fiscal year 159 United States publications, 332,191 copies, and 378 Allied publications, 156,778 copies, have been received and the majority distributed.

WORLD'S MOST POWERFUL RADIO STATION BUILT IN FRANCE.

Work at the great Lafayette radio station near Bordeaux, France, was temporarily discontinued after the date of the armistice, but arrangements were made later whereby the French Government is to take over this station after its completion by the Navy. Twenty per cent of the actual erection was done at the time of the armistice, and a contract for about \$250,000 was let on March 19, 1919, for the completion of the towers. This work is now going forward at a rapid rate and is practically finished. No installation of similar size is known elsewhere in the world. The steel work consists of eight towers 820 feet high, each taller than any other structure save the Eiffel Tower, and their erection demands the most skilled practice of the structural steel industry. A sending voltage of 140,000 volts is proposed for the antenna system, enabling it to communicate with points in all parts of the world.

SURPLUS STOCKS REDUCED—CONTRACTS CANCELED.

Providing amply for war demands, the supply department of the Navy had accumulated stocks and stimulated production to meet all possible requirements. When hostilities ended the immense influx of

stocks of ship's supplies and all the other articles necessary to maintain the fleet. the shipbuilding and repair yards and the stations and districts at home and abroad had to be stopped, diverted, re-stored, salvaged, sold, or held in condition for reissue.

A survey of all outstanding contracts was immediately made, with the result that 1,495 contracts for supplies were canceled or reduced. Of this number, 934 were canceled without any liability on the part of the Government, the total cancellations amounting to \$26,392,194.95. On 272 contracts for which the contracting companies claimed damages, adjustments were made at a total cost of \$10,780,700.30. the value of the canceled portions aggregating \$46,397,322.98. The sum paid to the contractors represented the value of raw and partly finished material and special tools taken over by the Government, overhead expenses, depreciation in market prices, machinery and buildings taken over or amortized by the Government, and profit allowed on work in process. No profits have been paid on the unperformed portion of any contract.

SALVAGE AND SALES AMOUNT TO \$30,000,000.

The work of salvaging material returned from abroad, from abandoned stations in the United States, from vessels formerly operated by the Navy and the sale of scrap and condemned material to the best advantage was immediately taken in hand. Having in mind the desirability of relinquishing leased storage, segregation and retention of articles and materials suitable for stock, and disposal of materials no longer needed, special boards of survey, appraisal and sale were established in the various naval districts. The total proceeds from sales conducted since the armistice was signed approximate \$30,000,000.

Paralleling the customary Navy procedure in the purchase of supplies, every effort is made, in making sales, to obtain the widest competition by advertising in the public press and by the issuance of schedules of sale to all prospective bidders on extensive mailing lists maintained for the purpose. The sales are made attractive to the smaller dealers by permitting bids on small or partial lots. Excess war stocks of certain articles of textiles, clothing, and provisions were authorized sold to the mechanics and laboring force of the various Navy yards and stations.

OVER \$7,000,000 REALIZED FROM WOOL SOLD AT AUCTION.

The success which attended the Navy's importation of wool from Australia for naval purposes was finally completed by the sale at public auction of the quantities which remained on hand in excess of the requirements. over \$7,000,000 being realized from the two sales held.

SALE OF VESSELS, SMALL YACHTS, AND MOTOR BOATS.

In view of the large number of vessels to be sold, it was found advisable to modify a number of unnecessary restrictions which tended to discourage bidding. The mailing list of interested parties was enlarged to nearly 5,000 concerns interested in this business. The vessels sold, or to be sold, are mostly small yachts and motor boats, and about \$900,000 has been realized from these sales so far. Many vessels listed for sale have not yet been disposed of, but every effort is being made to sell them to the best possible advantage.

ALL BUT 300 NAVY ORDERS HAVE BEEN SETTLED.

Although the Navy's commandeering powers were in no wise vitiated by the cessation of hostilities, the guiding principle followed has been that the department should lend its influence in so far as practicable toward the resumption of normal business conditions; and Navy orders have been issued only as a last resort, in but a few cases, and then only when it appeared that real competition was lacking or that unfair prices were being demanded.

Out of a total of 6,200 Navy orders issued during the war, all have been settled with the exception of 300, these awaiting final price fixing, and in most of these cases the delay has been due to causes beyond our control. It is believed that not more than a dozen cases of price fixing by the Navy will require final adjudication in the Court of Claims.

GREAT REDUCTION IN PURCHASES.

The opening of bids, the making of awards, and the preparation of contracts assumed a normal status with the return to peace conditions. Since November 11, 1918, requisitions have been filled from excess stock left over from war-time purchases whenever possible and a total of 640 advertised schedules, involving supplies to the value of \$58,575,239, have been canceled prior to award.

EXCESS STOCKS UTILIZED, ENFORCING ECONOMY.

In order that the excess stocks of materials available at the various navy yards and stations might be utilized and purchases reduced to a minimum, a system of inactive and excess stock reports has been centralized in the Navy Department, against which all requisitions are checked and substitutions made when necessary. By this clearing-house method there have been shipped between yards materials to the value of \$13,962,976, and requisitions canceled aggregating \$4,802,673. The Navy is in constant touch with other departments of the Government and with the Emergency Fleet Corporation, with a view to utilizing excess stocks.

SURPLUS PROVISIONS AND CLOTHING.

In its plans for demobilization, the Navy had a serious problem confronting it in the disposition of the excess stocks of provisions and clothing. During the late summer and fall of 1918, the estimates of quantities of provisions and clothing were based on an ultimate strength of 750,000 men; whereas demobilization commenced before the enlisted strength increased beyond 550,000 men. Stocks of provisions had been allocated through the Food Purchase Board when the season's crop was being harvested and the armistice, therefore, found the Navy with excess stocks on hand of practically all items of provisions.

Immediate steps were taken to cancel or reduce the contracts for clothing and small stores and as many items as possible of provisions were canceled; others were disposed of to the allied Governments, and others placed on sale at our yards and stations or sold by competition to the highest bidder. The clothing factories at Charleston and New York have been shut down, and efforts are being made to dispose of the excess stocks. All deliveries under the war-time contracts which could not be canceled have been completed.

THE NAVY RATION—ALLOWANCE ON SHIPS STANDARDIZED.

During the war, the rise in the cost of all staple articles of provisions was so great that it became increasingly difficult to establish an equitable ration allowance for destroyers and other vessels not carrying supply officers, the crews of which were subsisted on a money basis, due to the fact that there was no supply officer attached. Recognizing the necessity for increasing the ration allowance to keep pace with the rise in the cost of provisions during the war, this was done several times—first to 50 cents, then to 55 cents, and later on to 60 cents per man per day.

As requests for increases in the allowance continued to be received from individual vessels, a plan for determining what the allowance ought to be, based on the average rise in the provision market, was devised, and this plan has proved an admirable solution of the problem. The first allowance established as a result of this procedure was 66 cents; three months later it was automatically increased to 68 cents. It then became obvious that the percentage of increase (25 per cent) over the average cost of the ration in the battle fleet was too great; and it was accordingly reduced to 20 per cent. As a result of the latest computations, the allowance is now 72 cents, the average cost of the ration in the battle fleet being \$0.5999 for the preceding three months. The average cost of the ration during the year was \$0.5571 per man per day, as compared with \$0.4853 for the previous fiscal year.

FED 1,700,000 TROOPS RETURNING HOME ON TRANSPORTS.

Under the arrangement with the Army, the Navy had charge of the feeding of troops on transports, and the greatly accelerated movement in bringing home the American Expeditionary Force imposed a tremendous task upon the Supply Corps. Large amounts of supplies had to be provided and issued as needed, immense quantities of food cooked and served in limited time and space. The utilization of all space that could be made available for troops and the large numbers carried on vessels complicated the problem. When it is considered that 1,700,000 troops and passengers were fed on returning transports, in addition to their officers and crews; that on a vessel like the *Leviathan* more than 200,000 meals were served on a single voyage, the magnitude of such an accomplishment can be realized. It is estimated that a total of over 60,000,000 meals were served during the year aboard vessels of the Cruiser and Transport Force, to Army personnel, in addition to Navy personnel, crews, and passengers.

Three hundred and eighty-two supply officers were required for this work; and they have most efficiently performed their arduous duties.

NAME CHANGED FROM "PAY CORPS" TO "SUPPLY CORPS."

The naval appropriation act passed last July contains a provision for changing the name of the Pay Corps to Supply Corps. It had long been recognized that the work of the corps had far outgrown the name "pay" and that consequently the retention of this word in its title was not only inappropriate but actually misleading.

FUELING OPERATIONS—AMPLE FACILITIES PROVIDED.

From November 11, 1918, fueling requirements continued toward the peak and demanded special attention on account of heavy troop-return movements. The constantly increasing demands necessitated expedition in construction work, increase of storage space, and bunkering facilities. Stream-fueling barges of modern type, floating storage, additional coal towers, coal elevators, special mechanical coaling devices for bunkering side-port ships, locomotive cranes, and other equipment were acquired, enabling the Navy to keep pace with needs and providing ample facilities to meet the demands at important ports. The shore storage plant at Constable Hook proved equal to the demands expected of it and removed all anxiety and uncertainty in the matter of an adequate supply of coal for the large number of troop and other vessels operating out of New York. The mechanical bunkering equipment installed by the Navy at the

Hoboken piers proved entirely satisfactory for the quick turn around of troop transports and enabled the bunkering of ships at the rate of 8,000 tons in 16 hours, with a total turnover of 60,000 tons per week to vessels' bunkers.

The fuel depots at Newport News and Sewalls Point, Va., were completed, giving the Navy two well-equipped storage plants, with a capacity of 300,000 tons each. These depots are capable of delivering 3,000 tons in 24 hours to vessels at the piers, and coal can be stored at the same rate. Operations at the special bunkering depots—Lamberts Point and Newport News—were carried on with satisfactory results, permitting the issue of 3,000 to 5,000 tons of coal in 24 hours.

3,795,000 TONS COAL, 10,500,000 BARRELS FUEL OIL.

During the last fiscal year about 3,700,000 tons of bituminous and 95,000 tons of anthracite coal were required. The consumption of fuel oil, approximately 10,500,000 barrels, showed a tremendous increase over the previous fiscal year, and the consumption during that year (1918) was treble that of the fiscal year 1917. The total quantity of gasoline used was 13,645,000 gallons as compared with 11,500,000 gallons in 1918; also an increase of about 28,000 barrels of gas oil is noted, in that 68,000 and 40,000 barrels were used during 1919 and 1918, respectively. For aviation purposes, there were furnished 1,750,000 gallons of gasoline.

PLANS FOR DEVELOPING ALASKAN COAL FIELDS.

The Navy commission which recently investigated the Alaskan coal fields has submitted its report, which is being given full consideration in connection with the plans for the future development of those fields. This should, in time, prove a valuable source of supply for the Pacific Fleet and our bases, yards, and stations on the Pacific coast.

FIREPROOF STOREHOUSES FOR FLEET SUPPLIES.

The Navy has developed during the war—and particularly in the past year—some excellent examples of the modern fireproof storehouse. The Naval supply bases at New York and Hampton Roads were designed to carry out the idea of segregating fleet supply from industrial stock, thus relieving the local navy yard of a part of the supply work which had no direct connection with its normal activities. The system has worked out so well that it may be applied to other stations when funds are available for the development of these projects.

SPECIAL EXAMINATIONS MADE TO DETERMINE COMPENSATION.

Up to the end of the fiscal year, 518 special cost examinations had been made in connection with determination of fair compensation on Navy orders, the awarding of fixed price contracts, the approval of price on material orders for ships under construction, general price policies, etc. These examinations involved \$56,900,000, and the price reductions made on the basis of the cost examinations amounted to \$19,300,000. On June 30 there remained 232 special cost examinations to be made, involving \$33,200,000, principally in connection with cancellations of fixed price contracts.

DISBURSING OFFICERS MADE EXCELLENT RECORD.

Advances of funds to disbursing officers during the fiscal year amounted to \$2,047,573,981.33, the peak having been reached in October, 1918, when 418 requisitions were drawn on the Treasury for an aggregate of \$226,000,000.

The money expended by disbursing officers during this period of stress has been satisfactorily accounted for, except in a comparatively few cases, notwithstanding the tremendous volume and pressure of work. Many accounts, however, covering the principal period of activity remain to be examined by the Auditor for the Navy Department.

FOREIGN EXCHANGE—FRENCH CREDITS ADJUSTED.

In March the machinery which had been used to maintain definite rates of sterling, franc, and lire exchange was done away with, and exchange allowed to find its own level. This resulted in a general depreciation and fluctuation which still exists, involving many debits and credits to the appropriation "Pay, miscellaneous," on account of losses and gains on balances. Upon the basis of an understanding arrived at by the Treasury Department, a payment of \$107,000 was made to the French Government in June to adjust prior differences on French credits to Navy disbursing officers between the standard rate of francs and the current rates on dates negotiated; the current rates, although controlled, having been at times slightly higher or lower than the agreed rate.

TOTAL NET APPROPRIATIONS FOR THE WAR, \$3,357,993,878.

The following statement shows the amount of money made available to the Navy for the prosecution of the war:

Available balance, Apr. 1, 1917-----	\$26, 716, 218. 48
Naval act, Mar. 4, 1917-----	516, 607, 387. 08
Deficiency act, Apr. 17, 1917-----	9, 081, 569. 71

Deficiency act, June 15, 1917-----	\$514,805,033.87
Deficiency act, Oct. 6, 1917-----	561,483,059.29
Public No. 62, Oct. 6, 1917-----	150,000.00
Deficiency act, Mar. 28, 1918-----	63,569,809.25
Public No. 140, Apr. 26, 1918-----	1,000,000.00
Deficiency act, June 4, 1918-----	25,907,000.00
Naval act, July 1, 1918-----	1,573,388,360.84
Deficiency act, July 8, 1918-----	8,322,208.24
Public No. 223, Oct. 17, 1918-----	4,550,000.00
Deficiency act, Nov. 4, 1918-----	107,928,043.69
Deficiency act, Feb. 25, 1919-----	276,962,225.36
Allotted by President from appropriation "National security and defense"-----	1,883,408.90
Total amount appropriated-----	3,692,354,324.71
Less amount returned to Treasury by second deficiency act approved Feb. 25, 1919-----	334,360,446.65
Net total-----	3,357,993,878.06

AMOUNTS DISTRIBUTED TO VARIOUS BUREAUS.

The amounts appropriated were distributed to the various bureaus of the Navy Department as follows:

	Amount appropriated.	Amount returned to Treasury by act of Feb. 25, 1919.	Net amount avail- able for expendi- tures.
Office of the Secretary-----	\$1,195,993,614.05	\$98,000,000.00	\$1,097,993,614.05
Bureau of Yards and Docks-----	223,370,706.57	2,713,627.00	220,657,079.57
Bureau of Navigation-----	81,819,937.43	4,500,000.00	77,319,937.43
Bureau of Ordnance-----	825,314,875.87	164,833,843.69	660,481,032.18
Bureau of Construction and Repair-----	117,322,371.87		117,322,371.87
Bureau of Steam Engineering-----	110,011,296.59		110,011,296.59
Bureau of Supplies and Accounts-----	833,783,351.04	23,096,000.00	816,487,351.04
Bureau of Medicine and Surgery-----	38,032,937.09		38,032,937.09
Marine Corps-----	204,186,012.72	41,216,975.96	162,969,036.76
Amount available Apr. 1, 1917-----			26,716,218.48
Total-----	3,665,638,106.23	334,360,446.65	3,357,993,878.06

ACTUAL WAR COST APPROXIMATELY \$2,982,000,000.

The funds made available for the use of the Navy during the period from April 1, 1917, to June 30, 1919, amounted to \$3,357,993,878.06. Assuming that the expenditures for the Navy on a peace basis during this period would have continued to increase at the same rate as during the decade from 1907 to 1916, in which time the annual cost of the Navy grew from \$98,392,144.07 to \$152,821,540.67, the total expenditures for the Navy on a peace basis from April 1, 1917, to June 30, 1919, would have been \$375,598,947.77. Deducting this from the total available amount of \$3,357,993,878.06 shows that the additional amount of money required by the Navy on account of the war was \$2,982,394,930.29.

ESTIMATES REPRESENT ACTUAL NEEDS.

The estimates, by appropriation titles, of the amounts required for the support of the naval establishment and the Navy Department during the fiscal year ending June 30, 1921, will be found as an appendix to this report. I have endeavored to have them represent the irreducible minimum, although that is not easy of accomplishment with an accounting system, originated in 1906, which does not give expenditure figures according to the various objects into which lump-sum appropriations are divided.

A pressing need exists for textual improvement in many of our appropriations, but it would seem unwise materially to disturb the present order and arrangement until all accounting incident to the war shall have been completed. To do otherwise obviously would tend to confusion in the preparation of financial statements and reports of various characters covering the war period, for which a demand very probably will exist for a number of years to come.

\$40,115,584 LESS THAN FOR CURRENT YEAR.

The estimates for the naval establishment amount, in all, to \$573,-131,254.80, or \$40,115,584.08 less than the appropriations for the current fiscal year. Other than for ship construction, the appropriations recommended amount to \$387,883,254.80, or less than two and one-quarter times the appropriations carried for like purposes in the naval appropriation act approved August 29, 1916, despite the growth of the fleet, the shore establishment, and the personnel, to say nothing of advanced labor and material costs.

\$185,248,000 FOR CONTINUING WORK ON VESSELS.

The amount requested for continuing work on vessels heretofore authorized (\$185,248,000) is well in excess of the sum provided for the current fiscal year, but it is no more than necessary if work on the vessels is to proceed without interruption. There should be but one more appropriation necessary to complete the vessels of the 3-year program, authorized in the act of August 29, 1916.

AS TO THE NEW BUILDING PROGRAM.

The estimates contain no recommendation for the appropriation of money or for an authorization to proceed with any new ship construction. A separate estimate will be presented when the department has determined upon its recommendation as to new construction. I have before me the recommendations of the General Board, which are presented as Appendix A, and I will give these careful consideration and be prepared to state my views when the estimates are taken up for consideration by Congress.

REDUCTION IN ESTIMATES FOR DEPARTMENT.

For the Navy Department proper the total amount recommended is \$3,097,870. Included in this sum is \$819,510 for the pay of members of the Naval Reserve Force who were transferred to inactive duty and given employment in civil ratings pursuant to the legislation carried in the naval appropriation act approved July 11, 1919, and \$180,460 for pay of employees in the office of the Director of Naval Communications, heretofore paid from the naval appropriation "Engineering." Eliminating, for comparative purposes, these two amounts, the estimates for 1921 are \$125,110 less than for the current fiscal year. Actually the reduction is much larger, because the total of the annual compensation of those members of the Naval Reserve Force who were transferred to inactive duty and given employment in civil ratings in the Navy Department proper was \$2,835,566.80 at the time of transfer, whereas for 1921 the amount recommended is \$819,510.

PRESSING NEED FOR SALARY RECLASSIFICATION.

In view of the report and recommendations required by law to be submitted to Congress on or before January 12, 1920, by the Joint Commission on Reclassification of Salaries, no increases of pay have been recommended in the estimates for 1921. There is a real and pressing need for a salary reclassification such as contemplated by the act of March 1, 1919, and I earnestly hope that the commission's labors will bring early and satisfactory results. The civilian personnel of the Navy at Washington, in navy yards, and all Navy bases and stations, during the war vied with men in uniform in patriotic service. They received only small increase by Congress. Those whose efficiency and devotion aided so materially deserve just and adequate compensation.

CARED FOR SICK AND WOUNDED ON TRANSPORTS.

Caring for the sick and wounded, guarding the health of United States troops transported from Europe, in addition to the large Navy personnel, imposed heavy duties upon the medical department of the Navy, and its untiring vigilance and energy in meeting these demands deserves the highest praise.

Especial credit is due the medical officers and hospital apprentices assigned to the Cruiser and Transport Force, who, making voyage after voyage in constant attendance on the sick, with even their few hours in port devoted to securing needed supplies and equipment, displayed the most unflagging devotion to duty. They aided Army and Navy authorities in insuring, in the many vessels converted into

troopships, sufficient accommodation for sick and wounded, with provision for treatment according to modern hospital standards, and facilities for maintaining sanitary conditions aboard ship, the detection of contagious diseases and eradication of vermin to prevent the introduction of typhus fever into this country. In caring for the wounded and the sick aboard, the efficiency of the personnel increased with every voyage. The many expressions of appreciation from men of the Army have been very gratifying to the Navy, which was more than pleased to be able to render this service, and the fewness of the complaints testifies to the success with which this duty was performed under trying conditions.

FEWER INFLUENZA CASES ON SHIPS THAN ASHORE.

During the terrible influenza epidemic our medical officers and hospital corpsmen on the transports worked to the point of physical exhaustion, but they were rewarded by the fact that there were fewer cases, in proportion to numbers, on ships than there were on land, and lower mortality than among troops or naval personnel ashore.

Five hundred medical officers were assigned to the Cruiser and Transport Force. With the sick-bays on converted vessels and other transports, the Navy was prepared to handle on troopships 15,000 stretcher cases per month. This was 80 per cent of the total sick-bay accommodation, the remaining 20 per cent being reserved for the casual sick of crews and troops and returning sick and wounded of the Navy.

151,650 SICK AND WOUNDED BROUGHT BACK.

When it is considered that 1,700,000 troops and passengers were brought back on United States transports, that 151,650 sick and wounded were returned to this country, and that, during the period of hostilities, more than 900,000 troops had been carried to France on vessels manned by the Navy, some idea can be gained of our Medical Department's task in connection with troop transportation.

This was in addition to its vastly increased duties in caring for the health of the Navy and Marine Corps personnel, which expanded to ten times the number in service before the war, and was rendered more difficult by the influx of hundreds of thousands of recruits, the large forces serving abroad and the hundreds of added vessels for which medical attendance had to be provided.

In time of war one of the most difficult tasks is to prevent contagion and the spread of disease, liability to which is vastly increased by the gathering of great masses of men in armies and navies. Rigid sanitary measures and constant vigilance are required, and these were early provided for and well carried out. Only one really wide-

spread epidemic occurred in our forces, that of influenza, which swept over the world and affected civilian populations even more seriously than it did armies and navies. But even with the ravages of this disease, which all efforts could not prevent, the deaths from disease in the Navy and Marine Corps were much fewer, in proportion, than in previous wars. With the decline of influenza, conditions rapidly improved, and the showing in health and sanitation during the past year has been gratifying.

MEDICAL SERVICE ABROAD.

With well-equipped hospitals at or near important bases in England, France, and Ireland we were well prepared to care for our personnel. The best possible provisions were made for those on our ships in European service. Our battleships on duty in the North Sea were prepared for any emergency. Battle dressing stations were provided with reserve lighting devices, lockers were stored with surgical dressings, and there was every facility for the handling of wounded. Medical, dental, and nursing staffs were up to the complement and fully trained. Destroyers and smaller craft carried competent hospital corpsmen and more skilled medical assistance was within easy reach.

HOSPITAL CORPSMEN ON CARGO SHIPS.

Every vessel of the hundreds of cargo ships operated by the Naval Overseas Transportation Service carried trained hospital corpsmen. This first-aid and sanitary service was under the supervision of experienced medical officers stationed at New York, Baltimore, and Norfolk, who, with their assistants, visited each incoming or outgoing cargo carrier, saw to its medical equipment, and arranged for dispensary treatment, ambulance, hospital, and laboratory service, where required.

CARING FOR AIR SERVICE IN EUROPE.

In connection with the naval air service in Europe there were on duty in England, Ireland, France, and Italy 72 medical officers, 15 dental officers, and 298 members of the hospital corps. The sick and injured were cared for in buildings of the dispensary type—hutments and tents—or in permanent buildings assigned, loaned, or rented and modified to serve for the reception of the sick. Whenever neighboring hospitals were not available for major cases, local facilities were provided at the air stations.

SERVICE WITH MARINE REGIMENTS IN FRANCE.

Serving with marine regiments in France were 60 medical officers, 12 dental surgeons, and 500 hospital corpsmen. More than 300 cita-

tions, awards, or recommendations for honors were made in favor of these officers and men. Of the total medical department force with the Marines, 109 were wounded or gassed, 13 were killed, and 1 taken prisoner.

The base hospitals abroad were demobilized as soon as the occasion for their services passed. The last to be put out of commission was Base Hospital No. 5 at Brest, which had been the first to begin operations and had connected with it a medical supply depot. That portion of the personnel of these hospitals enrolled for temporary service has been discharged as fast as practicable.

DUTIES INCREASED AFTER THE ARMISTICE.

Instead of decreasing, as in most other branches of the service, the demands on the Medical, Dental, and Hospital Corps increased after the armistice, owing to the larger troop movement. From January 1 to July 30, 1919, 112,131 sick and wounded were returned from abroad by the Cruiser and Transport Force; in July and August the number was 8,538, of which 628 were men of the Navy and Marine Corps. At the height of troop transportation 300,000 men per month were embarked on transports. The health of all these had to be looked after, and, clearly, none of the medical officers in the transport service could be dispensed with. Even with the release of reserves and considerable numbers of the regular Navy, there still remained a large Navy and Marine Corps personnel to be cared for. So, demobilization of the Medical and Hospital Corps was necessarily slower than in any other branch of the service, but this has been accomplished as rapidly as conditions permitted.

REDUCTION IN MEDICAL PERSONNEL.

On July 1, 1919, the medical corps of the Navy consisted of 592 officers of the Reserve Force, 865 of the Permanent Establishment, and 315 holding temporary appointments. This left the corps far below its authorized complement for the existing strength of the Navy and Marine Corps. Medical officers of the Naval Reserve Force to the number of 749 had already been demobilized, as had 116 officers holding temporary commissions who presented urgent reasons for prompt return to civil life.

It was hoped that after the war many of the younger reserve officers and of those serving under temporary commissions would decide to remain in the service, but this has not proved to be the case, and new efforts must be made to induce more qualified physicians to enter the Medical Corps, which should appeal especially to those who have a special love for the sea, for change and travel. It offers the opportunity for service of the highest value not only

on ships and at stations but in the territories under our jurisdiction, such as Samoa, Guam, the Virgin Islands, and the Philippines.

MORE MEDICAL OFFICERS NEEDED.

The proper care of our sick requires that our hospitals shall always be sufficiently manned to permit the clinical, laboratory, X-ray, and surgical work and special treatment to be done by men of appropriate training, and our medical officers must have opportunity for study and special clinical work, and for this ample personnel must be provided.

There is a moral obligation not only to continue but expand the work of elevating and developing the population of our various island possessions or dependences, which rests largely on the medical officers and hospital corpsmen of the Navy. Our nurses are doing a noble work for the people of Haiti, Guam, and Samoa by the training of native nurses. Recently most of the inhabitants of the Virgin Islands have been, by vaccination, rendered temporarily immune to typhoid fever, and this is to be repeated hereafter periodically. These are only a few examples of the work we are doing, and must continue.

DENTAL CORPS HAS PROVED ITS VALUE.

Reports from all ships and stations continue to demonstrate the great value of the work of the dental officer, and many dental surgeons are needed. Before the establishment of this corps, our enlisted men were often exploited by men of inferior ability ashore, to the financial detriment of the men and involving loss of time to the service. Few remedial measures of recent years have given more satisfaction to enlisted men than the establishment of this corps.

REHABILITATION AND VOCATIONAL TRAINING.

Carefully elaborated plans were put into operation at various yards and stations by which the victims of war wounds received, through the cooperation of the local commandant, commanding officers of naval hospitals and a representative of the Federal Board for Vocational Training, splendid opportunities for reeducation and training in government workshops under medical and industrial supervision. Fortunately the number of cases in the Navy and Marine Corps requiring reeducation and training of this character was very small and when, in August, those who had been undergoing it at the request of the Federal Board had completed the course, it was discontinued.

BRINGING HOME THE REMAINS OF OUR DEAD.

Every effort has been made to comply with the wishes of the relatives of those who died at sea or ashore abroad during the war in regard to the disposition of remains. Members of the Hospital Corps received special instruction in embalming and a number of experienced licensed embalmers were enlisted in the Navy and Naval Reserve, so that, except in the case of those dying in France, it has been possible to return, for interment at home, the bodies of our men who died in Europe. There have been 29 burials at sea and upwards of 500 bodies have been embalmed and brought home.

The situation with regard to the 366 Navy and 2,800 Marine Corps dead in France and Belgium is complicated by the laws of those countries, and dependent, to a large extent, upon the ultimate disposition of the far larger number of Army dead. The practicability of exhumation and return of the remains of men who died in France has not been determined, but in the meanwhile all graves abroad have been carefully located, marked, and registered.

NAVAL MEDICAL SCHOOL DOING IMPORTANT WORK.

During the fiscal year the laboratories of the Naval Medical School, at Washington, made 13,000 clinical examinations of blood, sputum, etc., and 7,625 examinations of material sent in from cruising vessels and stations in the campaign to eliminate hookworm. In the chemical department 8,200 analyses, many of them of an intricate nature, have been carried out. The laboratories are of great value in facilitating diagnosis not only for the medical officers on duty in the naval hospital and naval dispensary, at Washington, but also for those stationed elsewhere. Various classes of instruction have been conducted for hospital corpsmen as well as medical officers, and a class for medical officers was begun on September 29 with a membership of 30.

DISTINGUISHED HONORS TO THE SURGEON GENERAL.

Recognition of the excellence of the work of the medical department of the Navy, under the direction of Surgeon General Braisted, has come from medical authorities at home and abroad. At the last session of the American Medical Association, Admiral Braisted was elected its president, the highest honor that can come to an American physician. This was not only a personal tribute to the Surgeon General but a tribute as well to the naval medical force. It is gratifying also to record that he has been made an Honorary Fellow of the Royal College of Surgeons of Scotland, one of the few Americans upon whom this honor has been conferred.

MARINES COMPLETE SPLENDID SERVICE ABROAD.

The marines who served with the Army in France have all returned from Europe, with the exception of a provisional battalion of 26 officers and 700 men. The record they made will remain one of the undying glories of the corps and the country. Upon their detachment from the American Expeditionary Force, the Secretary of War addressed the following letter to the Secretary of the Navy:

WAR DEPARTMENT, *August 12, 1919.*

Hon. JOSEPHUS DANIELS,
Secretary of the Navy.

MY DEAR MR. SECRETARY: In the process of demobilization the Marine Brigade, which by the President's order became a part of the American Expeditionary Force and was thus a part of the forces under the control of the War Department and under the command of Gen. Pershing, has now been returned to this country, detached from the Army, and restored to the control of the Navy Department.

I can not permit this heroic force to terminate its association with the Army without expressing to you, and through you to the officers and men of the Marine Corps, the deep sentiment of the War Department and the Army toward it. The whole history of the brigade in France is one of conspicuous service; when it was finally incorporated into the Second Division of the American Army it had early an opportunity to give a heroic demonstration of the unconquerable tenacity and dauntless courage of American soldiers. From then on in successive, almost continuous, battles the Marine Brigade and the division of which it was a part fought sternly and successfully until victory was obtained for the allied armies. Throughout this long contest the Marines, both by their valor and their tragic losses, heroically sustained, added an imperishable chapter to the history of America's participation in the World War.

On behalf of the Army I congratulate the Navy Department, the major general commanding the marines, those who have been instrumental in the formation and training of this splendid organization, and the officers and men of the organization itself.

Cordially yours,

NEWTON D. BAKER.

FOUGHT UP TO THE HOUR HOSTILITIES ENDED.

As a part of the Second Division, fighting shoulder to shoulder with their comrades of the Army, the Fourth Brigade of marines was in continuous service at the front from May 30, 1918, up to the moment hostilities ended, crossing the Meuse River under fire the morning of November 11, and establishing an important position along the heights of the river's far bank before 11 a. m., the hour at which the armistice went into effect.

Following more than six weeks' occupation of a sector south of Verdun, the marines were sent to the sector northwest of Chateau-Thierry, where, in June, they took part in the historic battles in which Hill 142 and the town of Bouresches were captured and the Belleau Woods cleared of German machine-gun nests, after weeks of

desperate fighting. On July 18, in spite of two sleepless nights and forced marches through rain and mud, the Fourth Brigade of marines, under command of Brig. Gen. Wendell C. Neville, participated in the surprise attack south of Soissons, one of the greatest strategical successes of Marshal Foch, and which marked the beginning of the "drive" which never ended until the retreating Germans sued for peace. During the better part of August the marines occupied the Marbach trench sector near Pont-a-Mousson, opposite the fortifications of Metz.

In the all-American offensive in September, which wiped out the huge salient of St. Mihiel, the marines shared with their fellows of the Army the glories of that brilliant operation.

Following a rest period of not more than seven days, they were again called upon, as part of the famous Second Division, to participate in an operation which has since gone down in history as the Battle of Blanc Mont Ridge.

BLANC MONT THE KEY TO RHEIMS.

Blanc Mont Ridge was the key to Rheims. It had to be taken to relieve that city, under fire for four years, from the German menace. Fought from October 3 to 9, the battle which resulted in its capture proved one of the most powerful and effective of the sledgehammer blows struck by Marshal Foch against the retreating Germans, and compelled the abandonment of the whole Rheims massif and a new German retirement of many kilometers on an extended front.

The general advance of the Allies during September paved the way for the assault on Blanc Mont. All along the line they struck in accordance with Foch's plan. Far to the west on the shores of the English Channel the little Belgian Army started the ball, striking viciously at the enslavers of their country. Eastward the reorganized British Army struck on a front between Cambrai and St. Quentin. The new-fledged American forces wiped out the St. Mihiel salient and struck again with greater vigor in the Argonne Forest, while all along the front from Suippes to the Argonne the French attacked in force.

ATTACKED, TIME AND AGAIN, WITHOUT SUCCESS.

By the end of September, however, the allied advance became slower and slower, the pendulum which had swung back from German gains of the spring and summer wavered and at last seemed to come to rest in what the Germans hoped would prove stable equilibrium to last throughout the winter. From the Channel to the Swiss border the line held, and the Germans worked feverishly

strengthening their defenses and preparing for winter. The allied High Command, however, had no idea of ending the campaign and going into winter quarters at that time. Foch and his staff studied maps and intelligence reports to determine where the next blow might be struck with the greatest promise of success, and the German line in the Champagne, north of the town of Suippes and Souain, was chosen as offering the greatest prospect of success at moderate cost, together with great strategic possibilities. Accordingly, an attack was planned, and the Fourth French Army, under command of Gen. Gouraud, the one-armed hero of Gallipoli, was sent forward to the assault. Two lines of German defenses were penetrated, then the advance was halted, and although five attacks in all were made by the crack shock troops of the French Army, no further progress could be made.

SECOND DIVISION SELECTED TO LEAD THE ATTACK.

Having used up several of his best divisions, and not desiring to deplete further the French reserves, Marshal Foch then decided to employ the Second American Division as the spearhead for this new decisive drive. On September 25 Maj. Gen. John A. Lejeune, of the Marine Corps, than whom America has no abler military leader, commanding the Second Division, reported to Gen. Gouraud at Chalons, and on the 28th and 29th the division arrived in the neighborhood of Suippes, becoming a part of the French reserve. On September 27 Gen. Lejeune was summoned to the headquarters of the Fourth French Army, where Gen. Gouraud and his staff were assembled around a large relief map of the sector in which the attacks had been delivered.

“WE CAN TAKE IT,” LEJEUNE TOLD GOURAUD.

Gen. Gouraud placed his hand upon the range of hills on the map representing Blanc Mont Ridge. Turning to Gen. Lejeune, he said:

“General, this position is the key of all the German defense of this sector, including the whole Rheims Massif. If this ridge can be taken, the Germans will be obliged to retreat along the whole front 30 kilometers to the River Aisne. Do you think your division could effect its capture?”

Gen. Lejeune responded that he felt certain the Second Division could take this German stronghold. Told that he would be ordered to make the attack within a few days, he was directed to prepare a plan for the assault.

HIGH PRAISE FROM COMMANDER OF FRENCH FOURTH ARMY.

How successful this attack proved, and the vital and brilliant results accomplished were set forth in the letter from Gen. Gouraud

to Marshal Foch, in which he recommended the citation of the Second Division:

Because of the brilliant part played by this "grand unit" in the offensive of the Fourth Army, during the autumn of 1918, I propose the Second American Division for a citation in "The Order of the Army" upon the following specific grounds:

The Second Infantry Division, United States, brilliantly commanded by Gen. Lejeune, played a glorious part in the operations of the Fourth Army in the Champagne in October, 1918. On the 3d of October this division drove forward and seized in a single assault the strongly entrenched German positions between Blanc Mont and Medeah Ferme, and again pressing forward to the outskirts of St. Etienne-a-Arnes, it made in the course of the day, an advance of about 6 kilometers.

It captured several thousand prisoners, many cannon and machine guns, and a large quantity of other military material. This attack, combined with that of the French divisions on its left and right, resulted in the evacuation by the enemy of his positions on both sides of the River Suippe and his withdrawal from the Massif de Notre des Champs.

TOOK PART IN ARGONNE-MEUSE OFFENSIVE.

Following a brief period of rest, during which replacements were received and the marine regiments were brought up to battle strength, orders were received detaching the Fourth Brigade from the Second Division and placing it under the orders of the Ninth French Corps, under whose orders the brigade undertook a forced march to Leffincourt, where they expected to enter the line. Orders were suddenly changed, however, and the brigade rejoined the Second Division to participate in the Argonne-Meuse operation. They marched more than a hundred kilometers in four days, with but one day of rest. The weather was bad and the roads ankle deep in mud.

Relieving elements of the Forty-second American Division, just south of Landre-et-St. George, the marines "jumped off," following a terrific barrage, at dawn on the morning of November 1, for their final operation of the Great War, the conclusion of which, after an advance of 40 kilometers, found them firmly established on the heights on the west banks of the Meuse.

DESTROYED LAST STRONGHOLD OF HINDENBURG LINE.

The result of the first day's advance is summed up in the following letter written on November 2 by the commanding general of the Fifth American Army Corps, under whose orders the Second Division was operating, to Gen. Lejeune:

I desire to add to my telephone message the assurance of my deep appreciation and profound admiration for the manner in which the Second Division executed the missions allotted to it on November 1.

The division's brilliant advance of more than 9 kilometers, destroying the last stronghold of the Hindenburg line, capturing the Freya Stellung, and

going more than 9 kilometers against not only the permanent but the relieving forces in their front, may justly be regarded as one of the most remarkable achievements made by any troops in this war. For the first time, perhaps, in our experience the losses inflicted by your division upon the enemy in the offensive greatly exceeded the casualties of the division. The reports indicate, moreover, that in a single day the division has captured more artillery and machine guns than usually falls to the lot of a command during several days of hard fighting. These results must be attributed to the great dash and speed of the troops and to the irresistible force with which they struck and overcame the enemy.

The division has more than justified the distinguished confidence placed in it by the commander in chief when it was selected to take the lead in the advance from which such great results are expected. It is an honor to command such troops and they have richly deserved a place in history and in the affection of their countrymen, which is not exceeded or perhaps paralleled in the life of our Nation.

I desire that you convey these sentiments to the officers and soldiers of the Second Division, and that you assure them of my abiding wishes for their continued success in the campaigns that lie before it.

DROVE GERMANS ACROSS THE RIVER.

During the early hours of November 2 orders were received to continue the attack, and that night the Second Division moved forward, overcoming the resistance of the enemy's advanced lines, and at 6 o'clock the next morning attacked and seized the German defense position on the ridge southeast of Vaux-en-Dieulet. Late in the afternoon another successful attack was made and after nightfall, in a heavy rain, the Americans pressed forward through the forest of Belval and occupied a position on the heights south of Beaumont, 8 kilometers in advance of the divisions on the right and left. During the night of November 4 the division again attacked, occupied the town of Beaumont and Letanne and threw the enemy on its front across the Meuse River.

ENEMY BARRAGE PREVENTED LAYING OF BRIDGES.

Plans were made to effect a crossing of the Meuse with the view of commanding the heights on the east bank of the river. After darkness had set in, November 10, two bridges were to be thrown across the river by the Engineers, one north of Mouzon and the other near Letanne. At the first intimation of a crossing the Germans laid down a violent counter artillery and machine-gun barrage along the entire river front. Their fire immediately blotted out all attempts to throw bridges across the river north of Mouzon, and although continued efforts were made by the Engineers throughout the night, the bridges could not be placed in position. The Letanne force was more fortunate, as the enemy fire did not develop in strength until preparations were nearly completed.

MARINES CROSSED MEUSE UNDER HEAVY FIRE.

In spite of the heavy fire two battalions of the Fifth Regiment of Marines crossed the river by 11.30 p. m. and advanced into the woods, cleaning up machine-gun outposts en route. Here they met with strong resistance, and were forced to wait until daylight in order to continue. By 10 o'clock the morning of November 11 the objective, which was the heights commanding the valley of the Meuse, had been reached; and the marines were "digging in." The armistice went into effect at 11 o'clock.

THE MARCH TO THE RHINE.

The Second Division being selected as a part of the American Army of Occupation, on November 17 the marines began their march to the Rhine, passing through Belgium and Luxemburg. During the march through the recently evacuated towns of France and Belgium the troops were enthusiastically cheered. Each little town was decorated with flags, bunting, and flowers; and committees of townfolk, headed by the mayor, met and welcomed the victorious division. In Luxemburg the enthusiasm was less marked, naturally decreasing as the division neared the border.

CROSSED GERMAN FRONTIER DECEMBER 1, 1918.

The German frontier was crossed on the morning of December 1. During the entire march the Americans followed closely upon the heels of the retiring Germans. The crossing of the Rhine was effected on December 13, and the marine brigade took up its position on the extreme left of the Coblenz bridgehead area.

During the early days of the occupation the Allies were by no means certain that the war was finally over. In the opinion of the commanding generals hostile outbreaks on the part of the Germans were to be expected, and a concerted attack against the armies of occupation was by no means beyond the bounds of possibility. While Germany was in a chaotic condition, the old Imperial Government had been overthrown and many provincial and local governments overturned, the German general staff and the national military organization were still intact; and the German Army was assembled, awaiting orders for demobilization.

KEPT IN HIGH STATE OF PREPAREDNESS.

Accordingly the strictest vigilance and the utmost precautions against surprise were maintained, outpost positions and patrols were established, and a strict guard maintained, which prevented Germans from leaving occupied territory or from entering from the neutral zone.

Drills were held constantly, evolutions practiced, equipment inspected and renewed, and the army of occupation maintained in a state of preparedness for any emergency. It was not until late in April that the German demobilization was complete, and the Army could, to some extent, relax this rigid vigilance. Regimental, brigade, division, and corps maneuvers were held at intervals. A great deal of excellent work was accomplished by the Red Cross, the Knights of Columbus, and the Y. M. C. A. workers in providing entertainment for the troops.

MARINES OPERATED RIVER PATROL ON THE RHINE.

A Rhine River patrol, with a number of boats in operation, was established. This patrol consisted entirely of marines, who manned the boats which plied up and down the river.

UPHELD BEST AMERICAN TRADITIONS.

It was my privilege, in the early part of April, to spend several days with the army of occupation in Germany, and to observe for myself the splendid bearing and efficiency of the celebrated Second Division, commanded by Gen. Lejeune, composed of Marines and men of the Army. Upon a review on the heights of Vallendar, overlooking the junction of the Rhine and Moselle Rivers, they bore themselves honorably as the victorious crusaders and defenders of right. Their record as preservers of order, dispensers of justice, and exemplars of Americanism won them as much reputation as their courage in battle.

Charged with a difficult duty, living in the midst of a conquered people, they upheld the best traditions of American soldiers, and by their self-restraint and quiet efficiency showed that an army of occupation can enforce the decrees of its government without harshness or bitterness. The people about them soon realized that they had the job of carrying out the terms of the armistice—that and nothing more—and that the officers and men bore them no malice and would permit no injustice to the native population. I was proud to be an American when privileged, in the occupied territories, to observe their efficient administration. Soldiers and marines alike refrained from any such acts as have so often in history brought a stain upon a victorious army of occupation.

The latter part of June the marine brigade, as part of the Second Division, concentrated upon the advanced line of the bridgehead area, remaining there until the Germans signed the peace treaty at Versailles. On July 16 entraining began and the division was taken by train to Brest. Sailing from Brest July 26 the division arrived

in New York early in August. During the entire period from July 29, 1918, the Second Division was commanded by Maj. Gen. John A. Lejeune, United States Marine Corps, and the Fourth Marine Brigade by Brig. Gen. Wendell C. Neville, United States Marine Corps.

REVIEWED RECORD OF SECOND DIVISION.

Recounting the record of the Second Division, which was composed of two brigades of infantry, one Army and one of Marines; two machine-gun battalions, one Army and one Marine; three regiments of field artillery, one regiment of engineers, one field battalion; train, sanitary, and other auxiliaries; the commanding general, Third American Army, addressed, on July 2, 1919, the following letter to Gen. Lejeune, commanding the division:

As your magnificent division is about to leave his command, it is with a sense of gratitude for its splendid achievements while in the American Expeditionary Force that the Army commander expresses to you and to your gallant officers and men his appreciation of your services.

After occupying a defensive sector between Verdun and St. Mihiel, you were placed in the line of battle, and met, with stubborn resistance, the onslaughts of the enemy's hordes near Chateau-Thierry. Your action at Belleau Wood and your attack upon the capture of Vaux must ever remain brilliant exploits in our military history.

At Soissons, side by side with a veteran French division, you proved to our Allies the fighting value of the Army of the United States, and at St. Mihiel, in the first great American offensive, your prowess in attack was irresistible.

When, in October, 1918, the allied high command desired to reinforce the French Army by American troops of great offensive worth, by real "shock troops," you were loaned to Gen. Gouraud's Fourth French Army, and delivered your famous assault on Blanc Mont Ridge, releasing from German menace the historic city of Rheims.

In the closing phase of the Meuse-Argonne operations, certainly no troops contributed more to the enemy's destruction than your division. After taking Landres-et-St. Georges, Bayonville-et-Chennery, and the Bois-de-LaFolie, you pierced the Bois-de-Belval, and by skillful night fighting and marching you cleared the enemy from the left bank of the Meuse and forced a crossing of the river.

Your brilliant exploits in battle are paralleled by the splendid example of soldierly bearing and discipline set by your officers and men while a part of the Army of Occupation. That spirit and dash which carried your men through the enemy's defenses still predominated when the Army was recently concentrated, preparatory to a further advance into unoccupied Germany.

Officers and soldiers of the Second Division, your achievements and sacrifices have earned for you and for your fallen comrades the praise and gratitude of our Nation.

MARINES SUSTAINED 11,968 CASUALTIES.

According to General Orders No. 66, Second Division, American Expeditionary Forces, published July 2, 1919, the Fourth Marine

Brigade sustained the following casualties between March 15 and November 11, 1918:

Killed, 55 officers and 1,459 men; died of wounds, 25 officers and 753 men; missing, 161 men; wounded (all classes), 252 officers and 8,277 men; gassed, 24 officers and 962 men; total casualties, 356 officers and 11,612 men.

MANY AWARDED MEDALS AND DISTINCTIONS.

One officer (Lient. Louis Cukela), and four enlisted men (Gunnery Sergt. Charles F. Hoffman, Sergt. Matej Kocak, Corpl. John H. Pruitt, and Pvt. John J. Kelly) were awarded Army medals of honor for various acts of gallantry and heroism above and beyond the call of duty while serving with the American Expeditionary Force in France. In addition to medals of honor, four officers were decorated with the Distinguished Service Medal, 88 officers and 261 men with the Distinguished Service Cross, 226 officers and 1,011 men with the Croix-de-Guerre (French), 15 officers with the Legion of Honor (French), 1 officer and 8 enlisted men with the Medaille Militaire (French), 1 officer with the Ordre de la Couronne (Belgian), 1 enlisted man with the Croix-de-Guerre (Belgian), and 1 officer and 5 men with the Croix-de-Guerre (Italian). All these decorations were for service with the American Expeditionary Force.

PARADED IN NEW YORK AND WASHINGTON.

Upon the return of the Fourth Brigade of Marines to this country in August, 1919, it paraded in New York as a part of the Second Division, and in Washington, the Fourth Brigade alone, as a part of the naval service, was reviewed by the President.

WHAT MARINES DID AT PONTANEZEN.

The largest concentration camp in France was established by the Army at Brest. In the early days when American troops were transported to France other ports were assigned as the ports for American transports, but later many men were diverted to Brest and the old camp built by Napoleon was assigned to the American forces. It answered for a few troops, who stayed a night and were then carried to the front, but as the number increased from thousands to hundreds of thousands in a short time, the task of enlarging the camp in a place where it rained incessantly proved to be one of the biggest jobs in France. Shortly after Gen. (then Col.) Smedley D. Butler, of the Marine Corps, arrived in Brest with his Thirteenth Regiment of Marines, he was placed in command of Camp Pontanezen. During the year beginning September 1, 1918, approximately

1,400,000 soldiers passed through this camp, at first hastening to the front, and after the armistice being routed through Brest for home. Gen. Butler converted a small and hastily improvised muddy camp into a great camp capable of caring for 106,000 soldiers, combatted the daily rains and defied the powers of mud, and made the camp clean, comfortable, sanitary, healthy, where soldiers found the best of food and the best possible surroundings. It was one of the big jobs in France, and Gen. Butler's excellent work won commendation in France and in America. His achievement was alike worthy of his great ability and of Marine Corps training and traditions.

MARINES DEMOBILIZED AFTER EUROPEAN SERVICE.

Although the act of July 1, 1918, temporarily increased the authorized strength of the Marine Corps from 693 officers and 30,000 men to 3,017 officers and 75,500 men, this total authorized strength was never reached, due to the cessation of hostilities on November 11, 1918. The highest strength was reached on December 11, 1918, when there were 1,678 officers, 257 warrant officers, and 65,666 enlisted men in the regular Marine Corps, and 452 officers, 31 warrant officers, and 6,704 enlisted men in the Marine Corps Reserve. Voluntary enlistments in the Marine Corps were resumed on December 4, 1918, and on the same date, enrollments in the Marine Corps Reserve were stopped.

RELEASE OF "DURATION-OF-WAR" MEN AND RESERVES.

With the signing of the armistice, demobilization became of paramount importance, and plans were at once put into effect for the release from service of duration-of-war men and reservists. However, as a wholesale reduction of personnel at that time would have seriously crippled the efficiency of the corps, it was decided to first release members of the Marine Corps Reserve and those men of the regular service who enlisted for the duration of the war, who wished to complete their education, or who had urgent family or business interests demanding immediate and personal attention, and an order to this effect was issued on November 20, 1918; on May 1, 1919, however, due to the demands of the service and the reduction of the enlisted personnel, it became necessary to limit the privilege of discharge to men whose release was necessary for urgent financial dependency reasons. Following the approval of the naval appropriation act on July 11, 1919, which provided sufficient funds to maintain the corps only at an average strength of 27,400, demobilization centers were established, and duration-of-war men were discharged rapidly.

TWO BRIGADES DEMOBILIZED IN TWO DAYS.

In August, 1919, the Fourth and Fifth Brigades of Marines, which had been serving with the Army in France, were returned to the Marine Barracks, Quantico, Va., and the naval operating base, Hampton Roads, Va., respectively, at which places the demobilization of these two organizations was effected. There were discharged or transferred to an inactive status, 6,677 enlisted men of the Fourth Brigade and 6,671 enlisted men of the Fifth Brigade, and this task was accomplished in the remarkably short time of two days. There were also about 200 officers of the two brigades who were either discharged or transferred to an inactive status in the reserve.

OFFICERS OBTAINED BY PROMOTION FROM THE RANKS.

Four hundred and thirty enlisted men were graduated from the second officers' training camp at Quantico, and 172 from the Army candidate school in France. These men were immediately enrolled as second lieutenants (provisional) in class 4, Marine Corps Reserve, and were subsequently appointed temporary second lieutenants in the Marine Corps. From the third officers' training camp at Quantico there were 235 graduates, who were immediately enrolled as second lieutenants (provisional) in class 4, Marine Corps Reserve, and immediately assigned to inactive duty. There were also 48 graduates of the Army candidate school in France who were enrolled as second lieutenants (provisional) in class 4, Marine Corps Reserve, and who were either discharged or placed on inactive duty upon their return to the United States, with the exception of 4 who were transferred to the temporary service.

The advisability of obtaining officers from the ranks was never better demonstrated than during the late war, and I believe that by making all appointments to fill vacancies in the future from the ranks, with the exception of such graduates of the Naval Academy as may be assigned to the Marine Corps, we will obtain the highest and most efficient class of officers.

RECRUITING AND RECRUIT DEPOTS.

Enlistments for the duration of the war were stopped immediately upon the signing of the armistice, and voluntary enlistments were resumed on December 4, 1918. With the cessation of hostilities, the principal incentive for enlisting no longer existed, and with the demands for men in all civil occupations and the high wages paid, the corps has found it difficult to obtain recruits. However, considering all the circumstances, the recruiting service has done remarkably well. During May, 1919, recruits were obtained for "special temporary limited service in France," with the understanding

that they would be discharged upon their return to the United States in the autumn when the purpose for which they enlisted would have been accomplished. These enlistments were discontinued on June 10.

TWO, THREE, OR FOUR YEAR ENLISTMENTS AUTHORIZED.

The naval appropriation act of July 11, 1919, authorized the transfer to the Regular Service of Marine Corps reservists, and also authorized the extension of enlistments of those men who had enlisted for the duration of the war. The results in securing men by such transfers and extensions have been very satisfactory. On September 18, the President authorized, until June 30, 1920, enlistments in the Marine Corps for a period of two, three, or four years, and this will prove a decided help in obtaining recruits.

The two recruit depots of the Marine Corps, at Parris Island, S. C., and Mare Island, Calif., were enlarged to take care of the temporary increase in strength authorized for the war, and were able to meet all demands made upon them.

AVIATORS AID MARINES IN HAITI AND SANTO DOMINGO.

Land and water flying with heavier and lighter-than-air craft at home and abroad is being accomplished by the Aviation Section of the Marine Corps, and marine aviation forces served with credit during the war on the northern sector of the western front and at Naval Base No. 13, in the Azores. Two squadrons are operating in Haiti and Santo Domingo, working in conjunction with the marine brigades in those places in the campaign to break up the bands of outlaws with which the countries have been infested, and have rendered valuable services.

THREE AVIATION FIELDS FOR MARINES.

Flying fields are under construction at Quantico, Va., and Parris Island, S. C., which will form the home stations for the aviation forces operating with the Atlantic coast advanced base and expeditionary forces. The construction of a marine flying field at San Diego, Calif., has been approved to accommodate the aviation forces operating with the Pacific coast advanced base and expeditionary forces.

AUTHORIZED STRENGTH OF CORPS, 27,400 MEN.

The naval appropriation bill, approved July 11, 1919, provided for an authorized enlisted strength of the Marine Corps, for the next fiscal year, of 27,400 men, plus such number of men as may be temporarily serving with the American Expeditionary Force abroad.

The demobilization of the two brigades which returned from France in August, and the discharge of duration-of-war men and reservists has reduced the strength of the corps so that the average strength for the year will not exceed the 27,400 authorized.

The bill also provided for the placing on inactive duty within 30 days of all female members of the Marine Corps Reserve, but also provided for the retention of such as were necessary and whose services were satisfactory, in the capacity of temporary civil appointments; and about 75 per cent were retained under this arrangement.

In accordance with my previous recommendations, I again recommend that for the next fiscal year the permanent authorized enlisted strength of the Marine Corps be 20 per cent of the present permanent authorized strength of the Navy plus the necessary allowance for aviation purposes. This would make a total enlisted strength of 27,467.

Special grades for enlisted men performing the duties of aviation mechanics are needed for the Marine Corps. Both the Army and the Navy now have these grades, and qualified men will not enlist in the Marine Corps for these duties when they can get higher pay for the same work in the Army and Navy.

In order to place the Marine Corps on a footing with the Navy, and to accelerate recruiting, it is recommended that the term of enlistment in the Marine Corps be the same as that provided for the Navy. This has been partly accomplished temporarily under an Executive order, but it is desired that the change be made permanent.

100 OFFICERS NEEDED FOR MARINE AVIATION.

To carry out the aviation program assigned the Marine Corps, 100 officers will be required. Forty of these will be automatically obtained by an increase of 1,000 men, and 60 additional officers are specifically asked for in the proposed legislation, as they can not be taken from the regular authorized strength without loss of efficiency.

If the permanent enlisted strength of the corps is increased as recommended, all of the present temporary officers who are eligible for transfer to the permanent commissioned personnel should be given an opportunity to qualify for such transfer.

SHOULD ESTABLISH GRADE OF CHIEF WARRANT OFFICER.

Twenty-five additional marine gunners and 25 additional quartermaster clerks are recommended, and it is also recommended that the grade of chief warrant officer be established in order that warrant officers of the Marine Corps may be on a parity with officers of the same grade in the Navy.

IN CUBA, HAITI, AND SANTO DOMINGO.

Expeditionary forces have been maintained, as in previous years, in Cuba, Haiti, and Santo Domingo. While there have been some outbreaks of bandits, the gendarmerie in Haiti and the constabulary in Santo Domingo, which are officered by members of the Navy and Marine Corps, have proven of the utmost value in maintaining peace and order.

ON DUTY IN ISLANDS AND ON SHIPS.

The regular Marine Corps posts have been maintained in the Virgin Islands; at Managua, Nicaragua; Cavite and Olongapo, P. I.; Peking, China; Guam, and Honolulu, as have also the marine detachments on board the larger ships of the Navy. All demands made upon the corps by the naval service have been met, and such duties satisfactorily performed.

WILL TRANSFER ADVANCED BASE FORCE TO QUANTICO.

The advanced base force was held available for service with the Navy during the past year. Since the signing of the armistice and the consequent demobilization of the war strength of the corps the personnel has been greatly reduced, but this will be remedied and the force reorganized as the men become available. The fixed defense part of this force, which has been stationed at Philadelphia, will be transferred to Quantico, Va., as soon as proper facilities are available at that station.

NEW RECORDS MADE IN MARKSMANSHIP.

Target practice was given special attention during the past year, and excellent results obtained, there being an extremely high number of qualifications in the grades of expert rifleman and sharpshooter. The Marine Corps rifle team squad was entered in the national matches, the National Rifle Association matches, and the Sea Girt tournament, and established a new record by winning 27 of the 34 matches in which they fired. Among the events won were the President's match, the national individual match, the united service match, the national team match, and the Sea Girt championship match.

DEPOT OF SUPPLIES, PHILADELPHIA.

Additional storage space at the supply depot, Philadelphia, is desired. There is sufficient ground, owned by the Government, adjoining the present building to accommodate a 10-story structure. During the war the depot outfitted and equipped 26 expeditionary units

for service in France and the West Indies. Nowhere in the Army or Navy was there superior efficiency shown than by Col. Cyrus Radford, in charge of this depot.

PARRIS ISLAND AND QUANTICO TRAINING STATIONS.

In accordance with the authority contained in the naval appropriation act of July 1, 1918, the Government on September 19, 1918, took possession of the balance of the land at Parris Island, and arrangements are being made for payment for the various properties involved. Additional barracks accommodations for about 4,100 men, messing facilities for 5,600, latrines and bathing facilities for 8,000 men, and quarters for 56 officers, besides larger storage facilities, dredging water approaches, extending sewer, light and power systems, new roads and walks and improvements along the water front, have been completed, and various other improvements are being made.

At Quantico the land we were authorized to buy has been acquired, and additional housing facilities begun have been completed, new water system installed, and we are making numerous other improvements.

BUILDING NEW BASE AT SAN DIEGO.

The preliminary work of dredging and filling in the land for the Marine Corps base at San Diego, Calif., is under way and is nearing completion. Six barracks buildings are in course of construction, and plans and specifications are being prepared for storehouses, power plant, laundry, etc.

FEWER COURTS-MARTIAL—MORE OFFENDERS RESTORED.

In the administration of its judicial system the Navy has sought to maintain discipline by the certainty and promptness of punishment with mercy, rather than the imposition of severe penalties. In instances which required imprisonment it has been enforced, except in the most serious cases, as a corrective, with the purpose of rehabilitating the offender by putting him on probation at as early a period as would justify a reasonable hope of success. The large majority of offenses are not criminal in their nature, but rather due to thoughtlessness and the failure to realize the importance of military obligations.

Never losing sight of the necessity of enforcing upon offenders penalties sufficient to preserve discipline, the Navy has sought to temper justice with judgment, not to resort to court-martial proceedings except in serious cases, and to avoid long and unprofitable sentences. Service on probation has been substituted for confinement whenever it was to be reasonably expected that benefit to the offender and the

service would result, and this has proved successful in a very large proportion of the cases. This was especially true in regard to men temporarily in the service who violated laws or regulations. It was realized that it would not be just to punish them with the same severity as might be applied to men of longer training thoroughly familiar with the necessary restrictions and regulations of military life, yet they had to be dealt with rigorously enough to maintain discipline. Demobilization, with the consequent release of so many men from service, increased the difficulty of this problem, and that it has been dealt with so successfully evidences the wisdom of the policies adopted.

FEWER TRIALS PROPORTIONATELY IN WAR THAN IN PEACE TIME.

It is a striking fact that instead of increasing in the war period the percentage of trials showed a decided decrease from that in time of peace. Not only was this true in regard to courts-martial, but also in regard to minor courts and punishments in general. In the fiscal year 1916 the percentage of men in the service tried by courts-martial was 2.35; in 1917, 1.75; in 1918, 1.17; in 1919, 1.24. By summary courts-martial, 1916, 15.72 per cent; 1917, 9.83; 1918, 3.84; 1919, 5.36. By deck court, 1916, 8.68; 1917, 4.93; 1918, 2.81; 1919, 4.01. In spite of the increased size of the Navy in the fiscal year ending June 30, 1919, when the average number of men under naval jurisdiction was 447,199, the number committed to prison was much less than during the preceding year, the percentage being reduced from 1.07 to 0.7, and the number of men in prison at the end of the fiscal year was 900 less than on June 30, 1918, though the average number of men in service had increased 35,000. During the year 897 men were restored to duty from naval prisons and 489 convicted by courts-martial were placed on probation for one year, sentence of confinement being held in abeyance.

RELIEF FOR MEN WHOSE TRIALS WERE DELAYED.

Delay in the disposition of some cases was unavoidable, especially in the period of demobilization, owing to the time required to trace service records and pay accounts, ascertain and prefer charges and specifications and issue instructions; but where this occurred steps were taken to remedy any injustice. On August 1, 1919, an order was issued providing for the restoration to duty of men who had been held for 60 days or more in confinement, or under restriction pending disciplinary action at navy yards, naval stations, and receiving ships, except those serving sentence of a court-martial, or convicted awaiting promulgation of the action in their cases; those

charged with offenses involving crime or moral turpitude, aggravated military offenses or graft. Under this order a number of men charged with minor offenses were restored to service, it being considered that the confinement they had undergone was sufficient punishment.

A JUDGE ADVOCATE CORPS SUGGESTED.

The Judge Advocate General has recommended, in his annual report, legislation establishing a judge advocate corps as an integral part of the Navy, and that provision be made for a law member to sit with each general court-martial, his decision upon questions of law arising in the conduct of the hearing to be binding upon the court, but he to have no voice in determining matters of fact which are at issue. The department has in a number of cases recently granted to accused persons a new trial when vital errors of law have transpired in the conduct of the hearing. Such errors, rare as they may be, tend to create a doubt as to the justice of the verdict. The retrial of cases is obviously expensive and productive of delay, which might be avoided if the courts had available men trained in the law. It is this which the creation of a distinct judge advocate corps would provide.

NAVAL PRISON—1,500 MEN RESTORED TO DUTY.

While 2,666 men were sent to the naval prison at Portsmouth, N. H., during the past fiscal year, on July 1, 1919, there were only 1,367 in the prison, as compared with 2,331 on the same date a year before. Two thousand men had been discharged after serving sentence, and 1,563, who, by good conduct, gave promise of restoration, were restored to duty. Of the 5,000 who were in the prison, at one time or another, during the year, only five escaped, and two of these returned later; and there were but 28 deaths. This gives some indication of the success of the policy which seeks to give men who have been convicted of offenses every opportunity for restoration.

SOME LAPSES INEVITABLE, BUT MANY "MAKE GOOD."

Individual lapses of conduct in prison, and failures among those restored to the service do occur, in spite of all efforts; but this is not a valid argument against the welfare league system, put in operation by Commander Thomas Mott Osborne, commandant of the prison. The prison does not deal with the best men in the Navy, but with the delinquent. Any salvage is an asset to the service, and there is no question that many of those restored have "made good."

Some have argued that restoring prisoners to the service might lower its morale, through the association of these men with their shipmates and loss of the fear which the severity of the old system

inspired. But fear has never proved effective in increasing efficiency and good conduct, and this is particularly true of the Navy. A man who has to be frightened into good conduct can never be of great value to the service. The effectiveness of any disciplinary institution depends much more upon the curtailment of liberty and the disgrace attendant upon it than it does upon severity. The effect upon his shipmates of a restored prisoner "going straight" and "making good" far outweighs the bad results that may result from failures.

COULD NOT HAVE BEEN HANDLED UNDER OLD SYSTEM.

The improvement in administration of the naval prison can not be appreciated without taking into account the many difficulties and complications arising from its fluctuating population as well as the much larger numbers received. It is not easy to conduct a prison with a stable population of 1,400, but when this fluctuates between 1,300 and 2,500, the total movement reaching 5,000 yearly, the difficulties are multiplied.

It would not have been possible to handle the problem satisfactorily under the old system. Three thousand guards, it was estimated; would have been required for patrol duty. Actually not more than 150 men have been employed for all purposes of guarding, including the work details in the navy yard. The prison was built, originally, to hold only 320 prisoners. To meet war requirements, a number of barracks were built in the immediate neighborhood. Under the old system it would have been necessary to surround these with high walls and extensive wire fortifications well guarded, in addition to the bolts and bars necessary for the prison buildings themselves. As a matter of fact, only a light wire fence has been necessary around a part of the inclosure, and no bars or gratings were placed in the buildings. The opportunities for escape were, of course, greatly increased, but notwithstanding this, only a very small proportion of the prisoners made any attempt to break out. But five remained away, and of these two returned, so that during the entire year the actual loss by escape has been three men.

FINE RESULTS OF SELF-GOVERNMENT PLAN.

There were during the year no riots, excellent conditions of discipline, and a minimum of punishments. These results have been obtained through the participation of the prisoners themselves in the discipline and government of the institution. It has been found wise to have the work gangs of prisoners directed by leaders appointed from among the prisoners, and the interior discipline of the

prison is entirely handled by officials selected by the prisoners' system of self-government known as the Mutual Welfare League. In this organization of their own, the prisoners take a pride, and toward it they manifest notable loyalty. The credit, therefore, for the excellent record in labor and good conduct while in confinement belongs largely to the prisoners themselves, who have shown that when faith is placed in them and opportunity given them to show whether this trust is deserved, they have risen finely to their opportunities.

PARDON FOR YOUNG OFFENDERS.

Under present laws conviction of desertion carries with it permanent penalties, the Attorney General having rendered an opinion that no man so convicted can reenlist or be reinstated in the naval service, even after pardon by the President. In some cases of desertion, especially by boys who do not realize fully the seriousness of their act, there are mitigating circumstances which deserve consideration. I have recommended a change in the law giving the President power, in his discretion, to grant a pardon to these offenders, allowing their reinstatement, with the provision that they shall serve such part of their enlistment as may have been lost on account of confinement under sentence imposed by court-martial.

SOCIAL HYGIENE BOARD DOING AN IMPORTANT WORK.

The Interdepartmental Social Hygiene Board, of which I have the honor of being chairman, has been in existence since July, 1918. Constituted by Congress, the membership of this board is made up of the Secretary of the Treasury, who is represented by Assistant Secretary of the Treasury J. H. Moyle; the Secretary of War; the Secretary of the Navy; Col. P. M. Ashburn, designated by the Secretary of War to succeed Lieut. Col. W. F. Snow, who resigned in September; Lieut. Commander J. R. Phelps, Medical Corps, United States Navy, designated by the Secretary of the Navy; and Asst. Surg. Gen. C. C. Pierce, United States Public Health Service, designated by the Secretary of the Treasury. The executive secretary is Dr. T. A. Storey, professor of hygiene, College of the City of New York. The work of the board has, unfortunately, been delayed because of the unavailability of the original administrative appropriation. This was made available through congressional amendment last July, and the organization is now being developed as rapidly as the Federal civil service machinery will permit.

THIRTY-ONE EDUCATIONAL INSTITUTIONS AIDED.

In spite of these unavoidable delays the board has accomplished some very important results the past year in its program for the

control of venereal diseases. Appropriations from its educational research and development fund have made possible the establishment or enlargement of departments of hygiene in 11 normal schools, 3 teachers' colleges, 3 colleges, and 14 universities. Among these 31 normal schools, colleges, and universities there are 3 institutions for the education of colored people. The institutions aided are located in 24 States. The curriculum of these departments of hygiene includes courses, conferences, and training in hygiene and its application, emphasizing the serious importance of venereal diseases, their causes, carriers, and prevention, as well as the other important facts and applications of general, individual, group, and intergroup hygiene.

The scientific research fund of the board has furnished appropriations to 15 scientific laboratories for the discovery of better medical methods in the treatment and prevention of venereal diseases. Twenty-eight researches are now being undertaken, carried out under the direction and by the expert service of 34 capable scientific investigators.

410 CLINICS ESTABLISHED IN 46 STATES.

Forty-six States have received allotments for assisting their departments of health in the prevention, treatment, and control of venereal diseases, under regulations promulgated by the Secretary of the Treasury through the United States Public Health Service. As a result 410 venereal-disease clinics have been established in the United States, thousands of individuals have been treated therein, and an extensive campaign has been carried on for the distribution of information relative to the hygiene of venereal diseases.

"RED-LIGHT" DISTRICTS KEPT CLOSED.

The civilian quarantine and isolation fund furnished support for the law-enforcement division of the Army and Navy Commissions on Training Camp Activities in its work relating to women from December, 1918, until March, 1919. On April 1 practically all of these law-enforcement activities of the Commission on Training Camps were transferred to the Social Hygiene Board. This field service of the board has given powerful assistance to State and other agencies, which have kept closed some 124 "red-light" districts that were closed up originally by the law-enforcement division of the Training Camp Commissions. During April, May, and June more than 6,000 delinquent women and girls were either sent home, placed on parole, or committed to some institution for treatment and care. This fund furnished also financial support for

assistance in the maintenance of venereally infected persons in 21 reformatories, detention homes, and hospitals who otherwise would have been a menace to the military and naval forces.

BOARD'S PROGRAM FOR THE COMING YEAR.

The program of the board for the coming year is actively concerned with (1) establishing departments of hygiene in normal schools, colleges, and universities, and establishing divisions of educational hygiene in State departments of education for the purpose of securing an appropriate and effective emphasis upon the hygiene of venereal diseases, their causes, carriers, injuries, and preventions; (2) furnishing resources for selected psychological and sociological researches for the discovery of better educational methods in the prevention of venereal diseases; (3) supporting selected scientific investigations for the discovery of better medical methods of prevention and treatment of venereal diseases; (4) assisting State departments of health in the organization of bureaus of protective social measures which shall be concerned with (a) "investigations of social conditions which make for the spread of venereal diseases and a search for foci of infection with a view to securing a proper care or detention of civilian persons infected with venereal diseases; (b) investigation of social influences that produce carriers of venereal diseases, and the follow-up work with persons who have been carriers, to prevent them from again subjecting themselves to conditions which may lead to infection; (c) investigation of prevention and facilities for the care and the maintenance of persons infected with venereal diseases;" (5) the allotment of funds to State departments of health for the continuation of the program laid out by the Secretary of the Treasury for the prevention, treatment, and control of venereal diseases, as directed by Congress.

NATIONAL RIFLE MATCHES HELD ON NAVY RANGE.

In recognition of the valuable service rendered in small-arms training, the National Board for the Promotion of Rifle Practice recommended that the national matches, heretofore conducted annually by the War Department, be conducted this year by the Navy Department on one of its own ranges, exemplifying its development in rifle-range construction and operation.

The national matches 1919 were held at the Navy range near Caldwell, N. J., the largest small-arms range in America, having 250 rifle targets and the additional advantage of being located within accessible distance of about 10,000,000 people. At the conclusion of the national matches the Navy transferred the improvements to the War Department and hopes to see this range become a center for the de-

velopment of rifle practice rivaling in importance the famous British range at Bisley, England.

ARMY FURNISHED BIG WAR EXHIBITION.

One of the pleasing features of the matches was the fine spirit of cooperation of Army and Navy. The War Department spared no effort to contribute to the success of the event, detailing for duty officers of special ability and furnishing ample motor transport facilities, a quantity of material salvaged from near-by Army stations, and ordnance supplies.

The War Department gathered at the matches the largest collection of war material yet assembled for exhibition; furnished a detachment from the Infantry School of Arms at Camp Benning, Ga., to demonstrate the most modern developments of all types of weapons used by infantry, and an aviation detachment, which gave demonstrations of the work of aviation forces in war. These special features attracted many thousands of interested visitors, and made this year's national matches the most successful ever held.

OPERATED BY NAVY AND MARINE VOLUNTEERS.

The force required to operate the range and serve the 5,000 visiting riflemen was composed of men of the Navy and Marine Corps who volunteered to remain in service beyond the time when many of them might have obtained their release. In spite of the breaking of a reservoir dam, inundating the whole region and undoing much of the arduous work of preparation, officers and men redoubled their efforts and accomplished their task in a most commendable spirit. Lieut. Col. William C. Harlee, United States Marine Corps, was the executive officer and had general charge of the arrangements, and to him is due a large measure of credit for the success of the national matches.

INTERNATIONAL MATCH WON BY AMERICANS.

A record number of entries were made in the individual matches, including the classic events of the National Rifle Association, which were held in conjunction with the national matches. The events included not only matches with the military rifle, but also daily pistol, small-bore and trap-shooting events, among them the notable international small-bore team match which was fired simultaneously in America and in England and was won by the American team at the national matches.

72 TEAMS IN NATIONAL TEAM MATCH.

More teams than have ever before competed in a national team match were entered. The 72 teams included the team from the Ameri-

can Expeditionary Force, the victor of the interallied team matches in France; four teams, the Infantry, the Cavalry, the Coast Artillery Corps, and the Philippine Scouts, from the Army; a team from the Navy at large, teams from the Great Lakes and Hampton Roads Naval Training Stations, a Marine Corps team, 15 National Guard teams, 8 college and reserve officer training camp teams, and 39 civilian State teams, including one from Porto Rico.

MARINES WON; A. E. F. CHAMPIONS SECOND.

After a warmly contested match, the match was won by the team from the United States Marine Corps, with the splendid team from the American Expeditionary Force as its closest competitor. The A. E. F. team was selected from the interallied matches by a tryout in France, in which all the regiments of the American Army were represented and among its 12 principals were 5 officers and men of the Marine Corps. The Marine Corps team, by a series of competitions beginning at practically every station of the corps and culminating in a final tryout, reflected their thorough training in rifle practice.

SMALL-ARMS PRACTICE—EIGHT RANGES RETAINED.

Seventeen small-arms ranges were being operated to full capacity by the Navy when the armistice went into effect. With an operating force of about 5,000, they were giving each month training in the operation, use and care of rifles and machine guns to more than 30,000 men of the Navy, Marine Corps, Army, and State Guards. These ranges were also open to all citizens capable of bearing arms, and were utilized by large numbers of civilians subject to call for military service.

Nine ranges—six of large and three of small capacity—have been closed, leaving eight ranges maintained under Navy control, these being at Wakefield, Mass.; Navy Yard, Philadelphia; Naval Academy, Annapolis; Virginia Beach; Great Lakes Training Station; Mare Island Navy Yard, Guantanamo, Cuba; and Olongapo, P. I.

General Board—Study of War and Peace Problems.

During the period of hostilities many important questions of naval policy were referred to the General Board, which also initiated suggestions and recommendations for the prosecution of the war; and since the armistice the board has made a comprehensive study of naval problems and recommended plans for the readjustment of the Navy on a peace-time basis.

Many of the questions proposed have required consideration of the latest and most approved practice upon methods abroad, as well as at home. To secure the best information possible, officers of our

Navy and Army and of foreign services and civilians having special knowledge and experience of the subjects under consideration were called for hearings. The stenographic report of these statements and proceedings furnishes a valuable documentary record. There were no fewer than 82 of these hearings, embracing a wide range of subjects.

The board considered and reported upon various problems, including aviation improvements in battleships, destroyers, and submarines, mine layers and mining operations, stabilizers for battleships and battle cruisers, submarine and aviation bases, fuel storage, armament of naval auxiliaries, and general naval conditions and policies.

CHANGES IN CAPITAL SHIPS CONSIDERED.

After the signing of the armistice the study of possible changes in the capital ships authorized was taken up. There was a feeling upon the part of some of the ablest naval officers that a new type of ship, a composite of the merits of the battle cruiser and the dreadnaught, might wisely be substituted for the two types. One of the objects of the visit of the Secretary of the Navy, Admiral Griffin, Admiral Taylor, and Admiral Earle to the allied nations of Europe was to confer with their naval experts as to the lessons the war had taught in the design and construction of capital ships.

Upon their return the result of their observations and conferences were made available to the General Board. That body, after giving hearings to officers of different views, arrived at a conclusion as to the military characteristics of the new capital ships which met the approval of the whole Navy, and it is upon plans approved by the General Board that these ships are being constructed.

It is believed that the recommendation of this body of naval statesmen, concurred in by the heads of the technical bureaus, will give to our Navy the mightiest fighting ships afloat, embodying the best features of ships abroad as well as at home.

Their annual report, embracing recommendations for a new building program, is printed as Appendix A of this report.

The Naval Consulting Board.

When our country entered the war and the Council of National Defense undertook its gigantic task, it found the Naval Consulting Board a working and efficient organization and formally requested it to become the War Inventions Board. Its head, the distinguished Thomas A. Edison, gave virtually all his time to that board and to naval study and experiment. He lived much of the time on a ship, worked in close harmony with naval officers, gave valuable assistance in the fight against the submarine menace, and aided in other

war measures. Under the direction of Mr. W. L. Saunders, active chairman, the members were assigned to special committees and too much commendation can not be given to their devotion and contributions along many lines of war efficiency.

UNDERTOOK EXPERIMENTAL WORK.

Beginning with the industrial inventory that stirred the country to a state of preparedness, and enlisted in this service a large number of technical men, the interest of scientists was thoroughly aroused by a special meeting in New York on March 3, 1917, at which there were present nearly all of the members of the board, representative naval officers, including Admiral Sims, and 35 well-known scientists representing principally the subjects of electricity, sound, and light. This was the first large gathering of highly trained technical men and naval officials held under the cognizance of the department. As a result of the meeting, considerable experimental work was undertaken particularly on the subject of submarine warfare, and several very interesting and instructive papers have been written and released for publication.

ANTISUBMARINE DEVICES—SHIP PROTECTION.

In June, 1917, the department found it advisable to place all activities on antisubmarine work under the direction of a special board with the commanding officer of the submarine flotilla as senior officer, and a member of the Naval Consulting Board was selected as advisory member of this board.

The ship protection committee of the Emergency Fleet Corporation, formed upon the initiative of Chairman Saunders, did work of special value to the merchant marine. Indeed, no subject received more study nor greater consideration from a large number of experienced authorities than that of protection of merchant vessels from submarine attack.

The New York office, under the management of the board's secretary, accomplished an immense amount of work in sifting ideas and granting interviews with those who submitted inventions or suggestions, and in this was ably assisted by the Chicago branch and the office in San Francisco.

One of the most important subjects investigated was that of the aerial torpedo and, while this device was not fully perfected, the difficulties are now understood, and we are nearer a solution of the problem.

Possessing several members who are authorities in the science of aeronautics, opinions of the board on many ideas submitted were of special value. Considerable research was undertaken in fuels and

their handling, particularly with the reduction of smoke and lessening the visibility of vessels at sea, and through the work of the board the rate of insurance was reduced on vessels complying with instructions worked out.

A complete and illuminating history of the Naval Consulting Board since its organization in 1915 is being prepared under the direction of a committee of the board. It will deal particularly with the activities and useful and patriotic service of the members of the board during the World War and its preparation activities before the war, and will be one of the most valued stories of scientific war work.

Council of National Defense.

The Council of National Defense gave full proof of its value to the Republic in time of war. But it is not entirely a war organization. Before the war it had secured inventories and obtained information that were of great service when active measures were undertaken to supply the Army and Navy. It is taking up the work of preparation and investigation, and will be the repository of information and the clearing house for all agencies that will be ready to be helpful in war. Working members from the six departments of the Government represented in the Council of National Defense are as busy to-day as in war, to keep track of industries and facilities which the Republic will need in any emergency.

The Compensation Board.

It was impossible during the war to obtain fixed-price contracts for the building or repair of ships, big ordnance material, and other munitions and extensions of naval equipment and naval plant. It was, therefore, necessary to make contracts for a fixed fee, leaving it to the Navy to pay the costs as ascertained. These so-called "Navy orders" saved millions of dollars, but required a large number of inspectors, skilled accountants, and clerks to check up every item of expense. The Compensation Board, headed by Rear Admiral Capps, has done a stupendous work in a way that would win the approval of all taxpayers if they could know the diligence and vigilance of the board. This work will continue until all contracts are completed.

Board of Inspection and Survey.

The taking over of ships in the early days of the war, the strenuous duties required of them during and since the war, the completion of new ships, and the survey and sale of many vessels this year, have imposed arduous and important duties upon the Board of Inspection and Survey, headed by Rear Admiral G. W. Kline. Indeed, it may be said that no officers have been given heavier or more difficult

duties, and they have performed them in a manner worthy of high commendation.

The Virgin Islands.

Since the Virgin Islands came under the control of the Navy, it has been the policy of the department to learn the needs of the people, aid in sound development, and give assistance and direction in necessary improvements. The annual deficits of \$225,000 have been met by appropriations by Congress, and this money has been administered in sanitation, health, education, public safety, preservation of law and order, public improvement, agricultural development, and relief of the poor.

Navy doctors, Navy nurses, and hospital corpsmen, aided by the American Red Cross, have waged a war against disease. A dearth of hospitals, surgical instruments, and laboratory appliances at first impeded the work, but these are being obtained. A training school for native nurses has been established in every municipal hospital. Modern surgery has been introduced, there has been a general decrease in the mortality of the islands, and, in general, the health of the population has improved under naval government. It was early seen that sanitation, preventive medicine, surgical hospitals, must be the first steps taken, and, with better sanitary conditions, betterment along all lines, educational and economical, has been advanced. Vigorous efforts are being made to stamp out venereal diseases, which are prevalent. Malaria is endemic and naval medical men are combating it.

There have been few breaches of the peace, and these have been met with firmness by the marines. Reports of race riots and disorder have been greatly exaggerated. The governor of the islands and all in authority have inculcated American principles of government, and are animated by the single purpose to give to the inhabitants of these islands the leadership and aid that will be most helpful to them.

Haiti and Santo Domingo.

Under the naval administration of Haiti the marine forces have assisted the Haitian gendarmerie in maintaining the established government and preserving order and suppressing banditry and robbery by the criminal and disaffected elements. Conditions have improved and the bandits are being dissipated or have surrendered. The education and health of the people have been improved, and the enforcement of law has been followed by prosperous days to the industrious residents.

Under American direction the financial condition of Santo Domingo shows steady improvement. When the military government was instituted in November, 1917, there was but \$35,000 in the treas-

ury, whereas on June 30, 1919, there was a balance of \$3,875,183.13. The school system has been reorganized and its capacity increased fivefold; the penal proceedings have been modified with the resulting acceleration of the progress of the administration of justice; the prison system has been improved; a new concrete wharf and customhouse and important port developments have been made; a national trunk line highway across the island has been surveyed, and is 30 per cent completed, and other important highways are under construction; improvements in agriculture have been made, the agricultural experiment station buildings completed, and the foundations laid for an agricultural college; the railroad service in the north of the island has been greatly improved; and a clean administration solely in the interest of the people has been the constant and successful aim of those to whom this trust has been committed.

Called to restore order and administer the finances of these governments close to us in geography and in interest, it is gratifying to report that there has been freedom from all suggestion of selfish aims on the part of the occupying civilian and military agencies. The development of the country, the education and welfare of the people, improvement in agriculture, the firm and kind administration of justice have born their fruit in the most prosperous era in the history of these neighbor governments.

Samoa and Guam.

These two islands came under Navy control after the Spanish-American War, and the Navy Department administers them through naval officers who have the title and authority of governors. Under such government the one care is the welfare and development of the people.

The terrible epidemic of influenza, which swept the South Pacific as well as other parts of the world, left American Samoa untouched, while there were thousands of deaths in other Samoan and South Sea islands. This was due to the rigid precautions adopted and sanitary measures enforced by our authorities. The natives this year received the highest price on record for their copra, which our authorities handle at their request; and conditions generally are so good that for the first time at the annual council of chiefs held on "Fono Day," not one complaint or suggestion of a change in laws or regulations was proposed.

The General Board has developed plans for making Guam, the center of a large area in the western Pacific, a strongly fortified naval base.

Distinguished Service Recognized.

The distinguished and meritorious service of the Navy personnel in the World War has been recognized and honored. Allied

nations have decorated a large number of officers and men of the Navy and Marine Corps who were privileged to serve across the seas. In pursuance of an act of Congress, the Navy Department was authorized to award distinguished-service medals and Navy crosses to officers and men who had rendered distinguished or conspicuous service. The act of Congress, authorizing these medals, sets forth as follows the character of service for which these distinctions are awarded:

That the President of the United States be, and he is hereby, authorized to present, in the name of Congress, a medal of honor to any person who, while in the naval service of the United States, shall, in action involving actual conflict with the enemy, distinguish himself conspicuously by gallantry and intrepidity at the risk of his life above and beyond the call of duty and without detriment to the mission of his command or the command to which attached.

That the President be, and he hereby is, further authorized to present, but not in the name of Congress, a distinguished-service medal of appropriate design, and a ribbon together with a rosette or other device to be worn in lieu thereof, to any person who, while in the naval service of the United States, since the 6th day of April, 1917, has distinguished, or who hereafter shall distinguish, himself by exceptionally meritorious service to the Government in a duty of great responsibility.

That the President be, and he hereby is, further authorized to present, but not in the name of Congress, a Navy cross of appropriate design and a ribbon, together with a rosette or other device to be worn in lieu thereof, to any person who, while in the naval service of the United States since the 6th day of April, 1917, has distinguished, or who shall hereafter distinguish, himself by extraordinary heroism or distinguished service in the line of his profession, such heroism or service not being sufficient to justify the award of a medal of honor or a distinguished-service medal.

A board, headed by Rear Admiral Knight, has given much time to the study of records, with an earnest desire to give recognition of courage and distinguished service. In a period when it may be truly said that every man in the Navy, at home and abroad, gave devoted and patriotic consecration to the duty assigned, medals might well have been given to hundreds of thousands. To select those who embraced opportunity for conspicuous service and valor has been no easy task. The duty has been conscientiously performed.

Naval Observatory's Work and Plans.

An international radio determination of differences of longitude to encircle the globe is proposed, and astronomers have indicated their desire that the Naval Observatory undertake this Government's share of the astronomical work and that the radio part be done by the Navy's radio service.

To furnish data needed for the American Ephemeris and Nautical Almanac, and improve the tables of the planets, moon, and stars,

the Naval Observatory plans to continue its observations for absolute positions of the fundamental stars and of the positions of stars, moon, and planets with reference to the equator and equinoxes. Demand for the American Nautical Almanac has largely increased, 5,153 copies of the 1918 issue being required, as compared with 1,165 copies of the 1916 edition. Five hundred copies of the Ephemeris were furnished to the American Expeditionary Force.

The production of navigational instruments by American manufacturers progressed so rapidly during the war that by November, 1918, the observatory was not only supplying the Navy but also 600 Shipping Board vessels and many Army transports and leased ships. The surplus remaining after the armistice has been absorbed by the requirements of vessels being completed by the Shipping Board, providing these ships with standard equipment.

Practically all the 32,000 glasses loaned by patriotic citizens to the Navy have been returned, with suitable acknowledgment of our appreciation of this valuable service.

The many instruments being turned in by vessels going out of commission are being sent to the repair shop of the observatory, and while this entails a large amount of work, it will convert what would otherwise be useless material into serviceable instruments.

Naval Intelligence.

Upon the close of hostilities the duties of Naval Intelligence reverted to normal operation. During the war it not only kept in touch with the naval thought and naval development throughout the world, but at home and abroad developed into a secret service agency that was the dread of spies, traitors, slackers, profiteers, and other evil forces that fatten on war. The story of its war work is one that will show its efficiency when written by those who were a part of this vigilant department of naval activity.

Naval History Being Recorded and Preserved.

The Navy made history in the World War, and it is our duty to see that it is recorded and preserved for our own as well as future generations. With this in view, there has been established a historical section, which is collecting, filing, and indexing naval war records, so they will be available for reference and for the use of historians. A number of monographs describing important naval activities are being prepared for publication. There is also in preparation a volume describing briefly the principal activities of the Navy, which we expect to have ready for publication early in 1920.

Efforts are being made to secure as complete a collection as possible of photographs, charts, maps, drawings, and publications relating to the work of the Navy. It is hoped that firms and private individuals, as well as men who served in the Navy, who have photo-

graphs or other material of historical interest will send either the originals or copies to the Historical Section, Navy Department, so that they may be preserved in our permanent war records.

Coast Guard's Service with the Navy.

The United States Coast Guard, which, in accordance with law, operated under the Navy Department for the period of the war, was by Executive order, transferred back to the Treasury Department on August 28, 1919. Its vessels and personnel made a valuable addition to our forces afloat, and its experienced officers and men proved their worth in service with those of the regular Navy and Naval Reserve Force.

Six Coast Guard cutters were employed in convoy and escort duty in European waters, the *Ossipee*, *Seneca*, *Yamacraw*, *Algonquin*, *Manning*, and *Tampa* forming a part of our forces based on Gibraltar, which escorted hundreds of vessels between the Mediterranean and Great Britain. It was while engaged in this duty that the *Tampa* was lost, with all her gallant officers and men, sunk at night in the English Channel by mine or torpedo. Only a short time before Rear Admiral Niblack had commended the *Tampa* in the warmest terms, recalling that it had steamed an average of 3,566 miles a month, being under way more than 50 per cent of the time; had escorted 18 convoys and had been kept in a state of high efficiency with an excellent ship spirit. This was typical of the service of the Coast Guard cutters in the war zone, and of the excellent record made by the Coast Guard while operating with the Navy. I wish to express my appreciation of the hearty cooperation of its officers and men, and of the way in which experience demonstrated the wisdom of the legislation which, in time of war, makes available the addition of this branch to our fighting forces.

A bill is pending in Congress to transfer the Coast Guard from the Treasury Department to the Navy. There is good reason and sound policy in putting all the Government's ships under the Navy, which has the facilities and the trained personnel and experience for their operation and care.

Coast and Lighthouse Service.

The Coast and Geodetic Service, assigned to duty with the Navy during the war, has been returned to the Department of Commerce. This service gave to the Navy good ships, capable navigators, and expert scientific men whose cooperation was so agreeable that the Navy parted from them with regret.

Women in the Navy.

There was a time when the Navy was said to be the one department of Government that could get along without women. But the war taught us that this supposition was incorrect. Before the

war it had been found necessary to enroll women nurses in naval hospitals and in aiding the native women of the Philippines, Guam, Samoa, and the Virgin Islands. Their service entitles them to the highest consideration. The imperative need for thousands of stenographers, typewriters and clerks in the early days of the war was met by enlisting women in the yeoman branch of the enlisted force, and, in all, more than 11,000 were enrolled. It had never been done before, but there was no law against it, and the new departure enabled the Navy to meet the emergency call and aided it greatly in the good record it made for efficiency. In obedience to the act of Congress, all the Yeomen (F), as they were called, (F signifying female), have been demobilized. Many of them remain as civilian clerks, Congress having made provision for their retention as clerks for the fiscal year. Numbers have taken the civil-service examination and will have permanent positions.

It was with genuine regret that the Yeomen (F) passed with the passing of war. They were truly enlisted for patriotic service in Washington and in every shore station, they released men for duty as soldier or sailor, and made a record of efficient performance of duty when their service was of the highest importance. Women also served in making and assembling the more delicate parts of torpedoes and in other branches of war service calling for skill and dexterity.

War Risk Insurance.

Upon their enlistment many men in the Navy availed themselves of the privilege of war risk insurance. It was a happy thought that placed such insurance within the reach of every man wearing his country's uniform. The opportunity of continuing this insurance should be embraced by every sailor and marine, and those who have permitted it to expire should see that their policies are restored. I chanced a few days ago to be looking over the papers of a 17-year-old boy from the mountains of Kentucky who was making his first cruise, and was glad to see that he had taken out \$10,000 worth of insurance and had made his mother the beneficiary.

Not a few mothers and wives live in comfort because their sons or husbands carried insurance policies in Uncle Sam's great insurance company. The sure way to induce Congress to make insurance permanent is for men in uniform to show their appreciation of the legislation. Why should not insurance at cost be extended by the Government to all in the public service?

Millions Invested in Liberty Bonds.

The men in the Navy did not stop buying bonds when the armistice was signed. They were among the largest buyers of Victory bonds,

and, upon pay that has been decreased by the decline in the purchasing power of a dollar, many of them have paid for these bonds by an economy which has required real sacrifice of the comforts of life. They were not only ready to give their lives in war, but to help pay the cost of war in peace.

Distinguished Visitors from Other Countries.

The country was honored, last June, by a visit from the President of Brazil, Dr. Epitacio Pessoa, who was returning from the peace conference in Paris to assume the duties of the high office to which he had been elected. An accident having occurred to the ship on which he embarked from France, a Navy transport took aboard President Pessoa and his party and brought them to America, and after his brief stay in this country we were privileged to convey him to Brazil in a United States battleship.

The visit of the King and Queen of the Belgians and Cardinal Mercier gave Americans an opportunity to express their admiration of that noble people who so bravely resisted invasion and by their heroic sacrifices rendered an invaluable service to civilization. They were accorded every honor, and the Navy was privileged not only to have them as guests on its vessels on voyage to and from Europe, but also on visits to the Naval Academy and other institutions.

The close cooperation of the British and American Navies during the war and their cordial relations made of especial interest the coming of the Prince of Wales, whose visit to the Naval Academy was one of the pleasing events of his brief stay in this country.

During the year ships of the British, French, Japanese, and Italian Navies have visited our ports, and we have been delighted to entertain officers and men of the forces with which we were associated in the war. Rear Admiral Johnke, of the Royal Danish Navy, director of the ministry of marine of Denmark, was one of our distinguished guests.

The Navy and the Peace Treaty.

The war demonstrated the wisdom of the epoch-making naval bill of August 29, 1916. Peace also bears testimony to its wisdom. Prior to the enactment of that legislation naval expansion was possible only by piecemeal in annual appropriations and authorizations. That act authorized the construction of 157 ships of the Navy, made provision for the necessary navy-yard expansion to make possible the construction of a portion of these ships in naval establishments by Navy personnel, and made the radical departure from the precedent of one-year to three-year provision. The coming of the war immediately demanding destroyers and more destroyers and small craft to meet submarine warfare, compelled concentration upon the

construction of the smaller craft and consequent delay in building the cruisers, dreadnaughts, and scout cruisers. As soon, however, as this pressing need was met, attention was given to the plans and contracts for the great ships authorized in the three-year program. Contracts have been let for all the ships authorized upon plans to incorporate the knowledge imparted by actual war conditions.

There was one provision in the Navy bill of 1916 which marked a departure in naval legislation which overrode precedent in the earnest desire to secure international agreement to prevent competition in big Navy building and the heavy burden it imposes upon the taxpayers of the world. That provision was the first recognition that it is to a war-making branch of government we may look for the longest step toward international peace the world has taken. Its significance was recognized by the President, who in his address in the evening of the day when he reviewed the Pacific Fleet in Puget Sound at Seattle, September 13, 1919, said:

All the nations agree to join in devising a plan for general disarmament. You have heard that this covenant was a plan for bringing on war. Well, it is going to bring on war by means of disarmament and also by establishing a permanent court of international justice. When I voted for that, I was obeying the mandate of the Congress of the United States. In a very unexpected place, namely, in a naval appropriation bill passed in 1916, it was declared to be the policy of the United States to bring about a general disarmament by common agreement, and the President of the United States was requested to call a conference not later than the close of the then present war for the purpose of consulting and agreeing upon a plan for a permanent court of international justice; and he was authorized, in case such an agreement could be reached, to stop the building program provided for by that naval appropriation bill. The Congress of the United States deliberately not only accepted, but directed the President to promote an agreement of this sort for disarmament and a permanent court of international justice. You know what a permanent court of international justice implies. You can not set up a court without respecting its decrees. You can not make a toy of it. You can not make a mockery of it. If you, indeed, want a court, then you must abide by the judgments of the court. And we have declared already that we are willing to abide by the judgments of a court of international justice.

The direction to which the President referred was incorporated in that section of the naval bill which authorized the three-year program. It has such international and lasting importance that the words of the text in the bill are incorporated here:

It is hereby declared to be the policy of the United States to adjust and settle its international disputes through mediation or arbitration, to the end that war may be honorably avoided. It looks with apprehension and disfavor upon a general increase of armament throughout the world, but it realizes that no single nation can disarm, and that without a common agreement upon the subject every considerable power must maintain a relative standing in military strength.

In view of the premises, the President is authorized and requested to invite, at an appropriate time, not later than the close of the war in Europe, all the

great Governments of the world to send representatives to a conference which shall be charged with the duty of formulating a plan for a court of arbitration or other tribunal, to which disputed questions between nations shall be referred for adjudication and peaceful settlement, and to consider the question of disarmament and submit their recommendation to their respective Governments for approval. The President is hereby authorized to appoint nine citizens of the United States, who, in his judgment, shall be qualified for the mission by eminence in the law and by devotion to the cause of peace, to be representatives of the United States in such a conference. The President shall fix the compensation of said representatives, and such secretaries and other employees as may be needed. Two hundred thousand dollars, or so much thereof as may be necessary, is hereby appropriated and set aside and placed at the disposal of the President to carry into effect the provisions of this paragraph.

If at any time before the construction authorized by this act shall have been contracted for there shall have been established, with the cooperation of the United States of America, an international tribunal or tribunals competent to secure peaceful determinations of all international disputes, and which shall render unnecessary the maintenance of competitive armaments, then and in that case such naval expenditures as may be inconsistent with the engagements made in the establishment of such tribunal or tribunals may be suspended when so ordered by the President of the United States.

It is ordinarily supposed not to be the function of navies, or within the province of a naval committee, to draft the chart by which a peace-loving nation hopes to navigate all ships of state into honorable and abiding peace. It is the glory of the Congress of 1916 that it forgot tradition and made a new precedent which guided the President and the American Peace Commission in proposing reduction of armament in the peace treaty. It is popularly supposed that the Navy is a fighting institution. It is that, and unless it is an effective instrument of war it fails in the purpose for which it was established. But fighting men, ready to surrender their lives for their country, and joyously, are the first to welcome sound measures to safely reduce armament and settle international differences in the forum of reason rather than in the conflict of battle. They agree with Joubert that there are two forces that rule the world—Force and Right—and they recognize with the great Frenchman that Force must rule until Right is ready. It was to open the way for the sway of Right that the 1916 bill authorized a conference like that which met at Paris and held out the hope to a war-troubled and war-cursed world that international agreements were possible and safe with the assurance that, when organized and functioning, reduction of armaments and reduced cost of war preparation would follow.

JOSEPHUS DANIELS.

REPORT OF THE SECRETARY OF THE INTERIOR.

DEPARTMENT OF THE INTERIOR,
Washington, D. C., November 20, 1919.

MY DEAR MR. PRESIDENT: I wish to make report upon the administration of this department for the past year and in doing so to primarily deal with coal, electricity, and petroleum, as the three sources of light, heat, and power, and the need for the adoption of certain constructive policies affecting their production and distribution.

In an age of machinery the measure of a people's industrial capacity seems to be surely fixed by its motive power possibilities. Civilized nations regard an adequate fuel supply as the very foundation of national prosperity—indeed, almost as the very foundation of national possibility. I am convinced that there will be a reaction against the intense industrialism of the present, but as it must be agreed that the race for industrial supremacy is on between the nations of the world, America may well take stock of her own power possibilities and concern herself more actively with their development and wisest use.

THE COAL STRIKE.

The coal strike has brought concretely before us the disturbing fact that modern society is so involved that we live virtually by unanimous consent. Let less than one-half of 1 per cent of our population quit their work of digging coal and we are threatened with the combined horrors of pestilence and famine.

It did not take many hours after it was realized that the coal miners were in earnest for the American imagination to conceive what might be the state of the country in perhaps another 30 days. Industries closed, railroads stopped, streets dark, food cut off, houses freezing, idle men by the million hungry and in the dark—this was the picture, and not a very pleasant one to contemplate. There was an immediate demand for facts.

How much coal is normally mined in this country?

By whom is it mined?

What is its quality?

To what uses is it put?

Who gets it?

How much less could be mined if coal were conserved instead of wasted?

What better methods have been developed for using coal than those of ancient custom?

Who is to blame that so small a supply is on the surface?

Why should we live from day to day in so vital a matter as a **fuel supply?**

What substitutes can be found for coal and how quickly may these be made available?

This is by no means an exhaustive category of the questions which were put to this department when the strike came. And these came tumbling in by wire, by mail, by hand, from all parts of the country, mixed with disquisitions upon the duty of Government, the rights of individuals as against the rights of society, the need for strength in times of crisis, calls for nationalization of the coal industry, for the destruction of labor unions, for troops to mine coal, and much else that was more or less germane to the question before the country.

Many of these questions we were able to answer. But if coal operators themselves had not carried over the statistical machinery developed during the war, we would have been forced to the humiliating confession that we did not know facts which at the time were of the most vital importance.

In a time of stress it is not enough to be able to say that the United States contains more than one-half of the known world supply of coal; that we, while only 8 per cent of the world's population, produce annually 46 per cent of all coal that is taken from the ground; that 35 per cent of the railroad traffic is coal; that in less than 100 years we have grown in production from 100,000 tons to 700,000,000 tons per annum; that if last year's coal were used as construction material it would build a wall as huge as the Great Wall of China around every boundary of the United States from Maine to Vancouver, down the Pacific to San Diego and eastward following the Mexican border and the coast to Maine again; and that this same coal contains latent power sufficient to lift this same wall 200 miles high in the air, according to one of our greatest engineers (Steinmetz).

Such facts are surely startling. They serve to stimulate a certain pride and give us a great confidence in our industrial future; yet they are not as immediately important, when the mines threaten to close, as would be a few figures showing how much coal we have in stock piles and where it is! And months since we called upon Congress to grant the money that we might secure these figures, but no notice was taken of the urged requests until, late in the summer, a committee of the Senate awoke to this need and indorsed our petition.

NATIONAL STOCK TAKING.

The Government should have a more complete knowledge of the coal and of other foundation industries than can be found elsewhere, and we should not fear national stock taking as a continuing process. It is indeed the beginning of wisdom. The war revealed to us how

delinquent in this regard we had been in the past. One day when the full story is told of the struggle of the Army engineer to meet war emergency demands, and this is supplemented by the tale of the effort made by the Council of National Defense and the War Industries Board, it will be realized more seriously than now how little of stock taking we have done in this generous, optimistic land.

When any such undertaking is proposed, however, it at once appears to arouse the fear that it is somehow the beginning of a malevolent policy called "conservation," and conservation has had a mean meaning to many ears. It connoted stinginess and a provincial thrift, spies in the guise of Government inspectors, hateful interferences with individual enterprise and initiative, governmental haltings and cowardices, and all the constrictions of an arrogant, narrow, and academic-minded bureaucracy which can not think largely and feels no responsibility for national progress. Needless to say this fear should not, need not be. The word should mean helpfulness, not hindrance—helpfulness to all who wish to use a resource and think in larger terms than that of the greatest immediate profit; hindrance only to those who are spendthrifts. A conservation which results in a stalemate as between the forces of progress and governmental inertia is criminal, while a conservation that is based on the fuller, the more essential use of a resource is statesmanship.

To know what we have and what we can do with it—and what we should not do with it, also!—is a policy of wisdom, a policy of lasting progress. And in furtherance of such a policy the first step is to know our resources—our national wealth in things and in their possibilities; the second step is to know their availability for immediate use; the third step is to guard them against waste either through ignorance or wantonness; and the fourth step is to prolong their life by invention and discovery.

COAL AS A NATIONAL ASSET.

Enough has been said, perhaps, to indicate how vast are the fields of coal which this country holds. It may be that any day some genius will release from nature a power that will make of little value our carboniferous deposits save for their chemical content. By the application of the sun's rays, or the use of the unceasing motion of the waves of the sea, the whole dependence of the world upon coal may be upset. That day, however, has not yet come; and until it does we may consider our coal as the surest insurance which we can have that America can meet the severest contest that any industrial rival can present. It is more than insurance—it is an asset which can bring to us the certainty of great wealth, and if we care to exercise it, a mastery over the fate and fortunes of other peoples.

Next to the fertility of our soil, we have no physical asset as valuable as our coal deposits. Although we are sometimes alarmed because those deposits nearest to the industrial centers are rapidly declining and we can already see within this century the end of the anthracite field, if it is made to yield as much continuously as at present, yet it is a safe generalization that we have sufficient coal in the United States to last our people for centuries to come. An extra scuttleful on the fire or shovelful in the furnace does not threaten the life of the race, even if some Russian or Chinese of the future does not resolve the atom or harness the hidden forces of the air. Whatever fears other nations may justifiably have as to their ability to continue in the vast rush of a machine world, there can be no question of our ability to last.

The present strike, however, makes quite clear, perhaps for the first time, that it is not the coal in the mountain that is of value, but that which is in the yard. And between the two there may be a great gulf fixed. Therefore, we are put to it to make the best of what we have. We turn from telling how much coal we use to a study of how little we can live upon and do the day's work of the Nation. And this is, I believe, as it should be. Indeed I feel justified in saying that the problem of this strike is not to be solved in its deeper significances until we know much more about coal than we know now, and this especially as to the manner in which it is taken from its bed and brought to our cellars.

PUBLIC RESPONSIBILITY.

This transfer is effected by a kind of carrier chain, the links of which are the operator, the miner, the railroad, and the public. We choose, to please ourselves, the link in this chain upon which we place the responsibility for its failure to work; but before indulging ourselves in abuse of arrogant coal barons or dictatorial labor unions, it may be as well to ask whether we of the public are not responsible in some part for this failure to function. I do not refer now to the failure of society to provide methods of industrial mediation or other adjustment of such labor difficulties. My question is, whether or not the public is at all at fault when a nation wealthy beyond all others in coal finds itself with so small a supply on hand when a strike comes—but a few days removed from the gravest troubles. The answer, to my mind, turns upon the manner in which we have done business.

We have been content to go without insurance as to a coal reserve. Each day has brought its daily supply. There was no thought of railroads stopping or mines closing down, so that large storage facilities have not been provided, and, indeed, we would rebel at paying for our coal the added cost of caring for it outside its native warehouse. We have not thought in terms of apprehension, but, as

always, in the calm certainty that the stream of supply would flow without ceasing. In some way there would be coal into which we could drive our shovels when the need was felt.

No wonder, therefore, that we are rudely disturbed when one link in the carrier chain—from coal-in-place to coal-in-the-furnace breaks. It simply is one of those things which doesn't happen. And not having happened sufficiently often to give us fear, we have had no thought that we should provide against it. It is a most heterodox thing to say, but we may find that a bit more foresight on the part of the public would certainly have made less sudden the present crisis. Let us look, for instance, into the matter of the coal miners' year and see if it is not fixed in some degree by the habit of the public in its purchasing.

THE MINERS' YEAR.

The record year, 1918, with everything to stimulate production had an average of only 249 working days for the bituminous mines of the country. This average of the country included a minimum among the principal coal-producing States of 204 days for Arkansas and a maximum of 301 for New Mexico. In such a State as Ohio the average working year is under 200 days. In 1917 the miners of New Mexico reached an average of 321 days, and in the largest field, the Raton field, it was actually 336—probably the record for steady operation.

This short year in coal-mine operation is due in part to seasonal fluctuation in demand. The mines averaged only 24 hours a week during the spring months. The weekly report of that date showed that 80 per cent of the lost time was due to "no market" and only 15 per cent to "labor shortage," while "car shortage" was a negligible factor. In contrast with this should be taken the last week before the strike, when the average hours operated were 39 and "no market" was a negligible item in lost time, while "car shortage" was by far the largest item. It follows that the short year is a source of loss to both operator and mine worker and is a tax on the consumer.¹

¹ In spite of the strike order, effective the last day of the week, the production of soft coal during the seven days Oct. 26–Nov. 1 was greater than in any week this year save one. The exception was the preceding week, that of Oct. 25, which full reports now confirm as the record in the history of coal mining in the United States. The total production during the week ended Nov. 1 (including lignite and coal made into coke) is estimated at 12,142,000 net tons, an average per working day of 2,024,000 tons.

Indeed had it not been for the strike, curtailing the output of Saturday, the week of Nov. 1 would have far outstripped its predecessor. The extraordinary efforts made by the railroads to provide cars bore fruit in a rate of production during the first five days of the week which, if maintained for the 304 working days of full-time year, would yield 715,000,000 tons of coal. It is worth noting that this figure is almost identical with the 700,000,000 tons accepted early in 1918 by the Geological Survey and the Railroad Administration as representing the country's annual capacity. During these five days, therefore, the soft-coal mines were working close to actual capacity. There can be little doubt that the output on Monday, Oct. 27, was the largest ever attained in a single day. (U. S. Geol. Survey Bull.)

With substantially the same number of mines and miners working this year as last, the accumulative production for the first 10 months of this year is 100,000,000 tons less than that mined in the same period last year. This 25 per cent loss in output means that both plant and labor have been less productive, and, in terms of capital and labor, coal cost the Nation more this year than last. For in the long run both capital and labor require a living wage.

The public must accept responsibility for the coal industry and pay for carrying it on the year round. Mine operators and mine workers of whatever mines are necessary to meet the needs of the country must be paid for a year's work. The shorter the working year the less coal is mined per man and per dollar invested in plant, and eventually the higher priced must be the coal. It is obvious that the 264 short tons of coal mined by the average British miner last year could not be as cheap per ton as the 942 tons mined by the average American mine worker, backed up as he was with more efficient plant. (A proud contrast!)

It would clearly appear that the coal business may be stabilized, not wholly, but in a very large measure, in some of the western fields,¹ if the public does not regard its supply of coal as it does its supply of domestic water, which requires only that the faucet shall be opened to bring forth a gushing supply. Coal does not have pressure behind it which forces it out of the mine and into the coal yard. It rather must be drawn out by the suction of demand. And herein the public must play its part by keeping that demand as steady and uniform as possible.

HAVE WE TOO MANY MINES AND MINERS?

The problem of the miner and his industry may be stated in another way. We consume all the coal we produce. We produce it with labor that upon social and economic grounds works as a rule too few days in the year. We therefore must have a longer miners' year and fewer miners or a longer miners' year and additional markets. One or the other is inevitable unless we are to carry on the industry as a whole as an emergency industry, holding men ready for work when they are not needed in order that they may be ready for duty when the need arises. There are too many mines to keep all the miners employed all of the time or to give them a reasonable year's work. This conclusion is based on the assumption that we now produce only enough coal from all the mines to meet the country's demand, which is the fact. More coal produced would not sell more coal, but more coal demanded would result in greater

¹ It is the western and southern fields that are most affected by the seasonal demand. As a typical example, Illinois may be cited, with 18 per cent of the year's production in 25 per cent of the time, April, May, and June, in 1915, and 15 per cent in 1916. Retail dealers received 27 per cent of the coal from Illinois in the period from August, 1918, to February, 1919, compared with 4 per cent from the Pittsburgh, Pa., field.

coal production. With the full demand met by men working two-thirds or less of the time in the year there can not be a longer year given to all the miners without more demand for coal. This seems to be manifest. Therefore the miners must remain working but part time as now, or fewer miners must work more days, or market must be found for more coal and thus all the miners given a longer year. If we worked all of our miners in all of our mines a reasonable year, we would have a great overproduction. And to have all our mines work a longer period means that we must find some place in which to sell more coal, either at home or abroad.

Why have we so many mines working so many miners? There can be no one-word reply to this question. It penetrates into almost every social and economic condition of the country—the initiative of capital, the size of the country, the pride of localities, the intense competition between railroads, their inability to furnish cars when needed, the manner in which cars are apportioned between mines, the manner in which the railroads are operated so that movement is slow and equipment is short, and this runs into the need for new facilities, such as more yards, more tracks, more equipment, which brings us into the need for more capital and so on and on.

We have none too many mines or too many miners to supply our need if the mines are operated as at present. But we have too many to fill that need if they are operated on a basis nearer to 100 per cent of possible production.

THE LONG VIEW.

Passing from the labor phase of the coal situation to the larger aspect of our coal supply as related to the whole problem of the economical production of light, heat, and power, which Sir William Crookes has characterized as “first among the immediate practical problems of science,” we find ourselves both rich and wasteful, following the primrose path, heedless of the morrow and not yet conscious that the morrow is to be a day of battle.

In the first place we treat coal as if it were a thing which was exclusively for home use, a nonexportable commodity which must be used “on the farm,” whereas it should be treated with profound respect, because we know from Paris that sacred treaties and national boundaries turn on its presence. The world wants our coal, envies us for having it, fears us because of it. It is not only useful to us, but it has a cash value in the markets of the world. Therefore it should be saved.

In the next place we treat coal as if it were all alike, not selected by nature for specific uses; whereas we should choose our coal with as scientific a judgment as we choose our reading glasses. There is coal for coke and coal for furnaces and coal for house use and coal

adapted for one kind of boiler and a different kind of coal for a different kind of boiler. Therefore we should discriminate in coal.

And again we have shown little willingness to dignify coal by seeking to draw out by improved mechanical processes all the stored content of heat in this lump of carbon. Instead we content ourselves by giving it a mere pauper touch, driving off the greater volume of its value into the air. This is a task for the mechanical engineer.

Then, too, there is the problem of using coal in the form of steam or in the more exalted form of electric current. The lifting, bobbing lid of James Watt's teakettle did not speak the last word in power. We are only beginning to know how we may move on from one form of motive power to another. The wastefulness of steam power as contrasted with electric power is a real challenging problem in conservation by itself.

And then we naturally ask, Why this long haul over mountains and through tunnels and across bridges and along streets and into houses, by railroad, truck, and on the backs of men, when at the very pit mouth, or within the mine itself, this same coal might be transformed into electricity and by wire served into factories and homes 100, 200, 300 miles from the mine? Why burden our congested railroads with this traffic? Why strew our streets with this dirt? This may be a practicable thing, a wise thing; it deserves study if coal is worth conserving.

Are there no substitutes for coal which we can use and can not export? This question immediately raises the water-power possibilities of our land, of which only the most superficial study has been made. Sell coal and use electricity would appear a thrifty policy.

As petroleum is being used as a substitute for coal—and inasmuch as the whole problem of fuel supply is one—we are ultimately compelled to an investigation of the ability of our petroleum supply to meet its present drain and to meet the expansion in its use, which is the most surprising development of our day in the study of power creation.

This spells a program of development and conservation which should challenge the ambitions of this Nation, and on a few of its features perhaps a few further words would be justified.

SAVING COAL.

The two ways by which coal in greatest volume can be saved are the discovery of the method by which more power can be taken from the ton and the discovery of what kind of coal is best fitted for any particular use.

It has been everyone's business to save coal, hence The railroads have experimented with some success. They get perhaps 10 per

cent of the heat energy from a ton shoveled beneath the locomotive boiler, 10 per cent of the total in the ton. They use one-quarter of all the coal mined. Next to labor this is the greatest expense which our railroads have. This shows how great the problem is to them. Some have adopted a system of paying a bonus for the greatest distance made on a given quantity of a given coal. But this laudable effort has not met with the cooperation that would be expected from the firemen, for reasons that go far afield. Industries, especially those which generate electric power, have made similar effort to gain from their fuel its greatest potentiality, and with varying success. We can overlook the stoking of the domestic furnace as a national concern, for the amount of coal used in this way amounts to not more than 17 per cent of the national coal bill, and this whole charge could be saved, it is estimated, by giving care to the 75 per cent of our coal which is burned under boilers to make steam. Here there is a maximum figure of 13 per cent of the energy of the coal put into harness, and the average is less than 10 per cent, even in the larger plants.

In one establishment visited by the fuel engineers of this department during the war a preventable waste of 40,000 tons a year was discovered. By changes in the admission of air to the furnaces and in the "baffling" of the boilers the engineers of the Bureau of Mines are confident that they have been able to increase the economy of coal in the ships of the Emergency Fleet Corporation by 16 per cent, making 6 pounds of coal do the work of 7. If such a percentage of economy could be generally effected it would mean the saving of as much coal as France and Italy together will need in this year of their greatest distress.

COAL AND COAL.

The Government should sample and certify coal. We do this as to wheat and meat; it is just as necessary to avoid injustice in the case of coal, and it is thoroughly practicable. The public should know the kind of coal it is buying, because it should buy the coal it needs. There need be no prohibition against the mining or selling of any coal,¹ but coal should sell in terms of its capacity to de-

¹ In every trainload of coal hauled from the mines to our coal bins, 1 carload out of every 5 is going nowhere. In a train of 40 cars, the last 8 are dead load that might better have been left in the bowels of the earth. No less an authority than Martin A. Rooney states: "Every fifth shovel full of coal that the average fireman throws into his furnace serves no more useful purpose than to decorate the atmosphere with a long black stream of precious soot. At best one-fifth of all our coal is wasted."

The first requisite toward effecting fuel economy is to secure cooperation between owners, managers, and the men who fire the coal. Mechanical devices to increase efficiency in the use of coal can not produce satisfactory results unless the operators who handle them are impressed with the importance of their duties.

It is not essential for the plant manager to be a fuel expert, but he should be familiar with the instruments that give a check on the daily operations. It is a mistake not to provide proper instruments, for they guide the firemen and show the management what

liver heat. Some coal that is only a pint bottle is selling as a quart bottle. And the quart is hurt by the competition of the pint. A bill to effect such fuel inspection has been drafted and will be presented to Congress. It is not a bill commanding anything, but rather gives to those who are willing an opportunity to have their product inspected and attested and thus acquire merit in the eye of the world as against those who are not willing to subject their coal to the official test tube. Coal is coal in the sense of the classic traffic classification. Coal is, however, not always coal, nor is it altogether coal when put to the pragmatic test of the furnace. If such a bill were passed it would promote the interests of those who schedule their price upon the merit of their goods and make against the hauling of slate and dirt, its storage and handling under an assumed name. The plan is not to punish the malefactor who attempts to impose upon the public a slender number of thermal units as a ton of coal, but rather to give to every man an opportunity to advertise the number of such units which his particular article contains, thus enabling the injured public to strike against an unfair mine.

Furthermore we are to become great exporters of coal, unless all signs fail, and such certification should be required as to every ton sent abroad.

EXPANSION ABROAD.

It has been said that we have too many mines in operation, as we appear to have too many miners, if we are to maintain only our present output. Rapid expansion in the development of industry in general may justify the existence of such mines and so large a corps of workers, even with an adequate car supply and more abundant local storage facilities, which are greatly needed in almost all places, and a more even demand. If, however, this should not be so, there is a foreign demand for the best of our bituminous coals, which at present we are altogether unable to meet for lack of credits on the part of those who wish the coal, and lack of ships to carry it. England's annual production has fallen 100,000,000 tons, according to

has taken place daily. Instruments provided for the boiler room manifest the interest taken by the management toward conserving fuel. It indicates cooperation and encourages the firemen to work harder to increase the efficiency.

A second factor effecting fuel economy is the selection of fuel for the particular plant. It is not expected of a plant manager that he should be thoroughly informed as to the character of all fuels; but he can enlist the services of a man who is thoroughly trained in this field. The Bureau of Mines has compiled valuable information on the character and analyses of coal from almost every field in the United States. Information concerning the character and chemical constituents of the coal, together with knowledge pertaining to the equipment of the plant, makes it possible to select a fuel adapted to the equipment, thereby insuring better combustion. Hundreds of boiler plants operate at no greater than 60 per cent efficiency, and it would be a comparatively simple matter to bring them up to 70 per cent efficiency. The saving in tonnage would be more than the combined yearly coal-carrying capacity of the Baltimore & Ohio and the Southern Railway systems. The direct saving to our industries at \$5 per ton would amount to \$200,000,000 worth of coal per year.

Mr. Hoover, and the European demand next year will be more than 150,000,000 tons above her production. Whatever the world need, it can not be supplied. It is too large for any possible supply by ship, even if all necessary financial arrangements could be made, either by loan or credit. Europe, indeed, will sadly learn through this winter how little coal she can live on and how more than perilous is the state of a people who are short of power, light, and heat.

As this country prior to the war sold abroad no more than 4,500,000 tons as against England's 77,000,000, it is quite manifest that here will be a new field for American enterprise, the enterprise being needed not for the winning of markets as much as for finding ways of dealing with the larger phases of a heavy overseas trade with those who are without immediate resources.

SAVING COAL BY SAVING ELECTRICITY.

It is three years since Congress was urged that we should be empowered to make a study of the power possibilities of the congested industrial part of the Atlantic seaboard, with a view to developing not only the fact that there could be effected a great saving in power and a much larger actual use secured out of that now produced, but also that new supplies could be obtained both from running water and from the conversion of coal at the mines instead of after a long rail haul. A stream of power paralleling the Atlantic from Richmond to Boston, a main channel into which run many minor feeding streams and from which diverge an infinite number of small delivering lines—the whole an interlocking system that would take from the coal mine and the railroad a part of their present burden and insure the operation of street lights, street cars, elevators, and essential industries in the face of railroad delinquencies—this is the dream of our engineers, and a very possible dream it has seemed to me; of such value, indeed, that we might well spend a few thousand dollars in studying it, not with the thought that the Government would construct or operate even the trunk line, but that it might so attract the attention of the engineering and financial world as to make it a reality.

To tie together the separated power plants of 10 States so that one can give aid to the other, so that one can take the place of the other, so that all may join their power for good in any great drive that may be projected—this would be the prime purpose of the plan; and from this would evolve the development of the most practicable method of supplying this vast interdependent system with more power—perhaps from the conversion of coal, as it drops from the very tippie, using the mine as one might use a waterfall, or by the development of great hydroelectric plants on the many streams from the Androscoggin to the James.

WHITE COAL AND BLACK.

This would be a plan for the wedding of the stream and the mine, the white coal with the black. "White coal" they call it in imaginative France, this tumbling water which is converted into so many forms; and a much cleaner, handier kind of coal it is than its black brother. And cheaper, for the water goes on to return again and fall once more and forever into the pockets of the turbine which whirls the dynamo and so gathers or releases that mystery which we name but never define. Farsighted, purposeful Germany fought four and a half years upon the strength of great power plants run by the snows of the Alps. She did not rely on these alone for power, nor were they her main reliance, but they gave her a lasting power which otherwise she would not have had. And we may expect her to improve on that war-time experience for the conduct of the hard fight she is to make in the industrial field. France saved enough territory from the invader to permit her to make new adventures into this field and so to some degree offset the coal loss of Lens. Italy found that she had still left unused opportunities for hydroelectric development sufficient with the coal she could secure from England and America to see her through the war. And with coal conditions as they are in Europe we may expect a still greater push to make use of water power to turn the industrial wheels of peace. It must be so likewise here.

And it is likely that the long-pending power bill which will make available the dam and reservoir sites on withdrawn public lands and make feasible the financing of many projects on both navigable and unnavigable streams will soon have become law. We shall then have an opportunity that never before has been given us to develop the hydroelectric possibilities of the country. And this raises the question as to their extent.

The theoretical maximum quantity of hydroelectric power that can be produced in the United States has recently been estimated by Dr. Steinmetz, who calculates that if every stream could be fully utilized throughout its length at all seasons, the power obtained would be 230,000,000 kilowatts (320,000,000 horsepower). It is clear that only a fraction of this absolute maximum can ever be made available. The Geological Survey estimates that the water power in this country that is available for ultimate development amounts to 54,000,000 continuous horsepower.

The census of 1912 showed that the country's developed water power was 4,870,000 horsepower, about 9 per cent of the maximum power available for economic development and less than 2 per cent of the total that may be supplied by the streams as estimated by Dr. Steinmetz. According to the census, stationary prime movers representing a capacity of more than 30,000,000 horsepower, fur-

nished by water, steam, and gas, were in operation in the United States in 1912. (This amount does not, of course, include power generated by locomotives, marine engines, automobiles, and similar mobile apparatus.) The average power furnished by these stationary prime movers was probably not more than 20 per cent of their installed capacity, so that the power produced in 1912 was equivalent to probably not more than 6,000,000 continuous horsepower.

As the estimated available water power given above represents continuous power the country evidently possesses much more water power than it now requires, so that there would be an ample surplus for many years if the power were so distributed geographically that it could be economically supplied to the industries that need it. But as a matter of fact the water-power resources of the country are by no means evenly distributed. Over 70 per cent of the available water power is west of the Mississippi, whereas over 70 per cent of the total horsepower now installed in prime movers is east of the river. Therefore unless the East is to lose its industrial supremacy it must press and press hard for the development of all water-power possibilities!

THE AGE OF PETROLEUM.

For a full century now we have been passing through different phases of industrial and commercial life which have been characterized by some form of power. First the age of steam, and then the age of electricity. We have passed out of neither and yet we have come into another age—that of petroleum. As a lubricant, it has become of such universal use that it has been called the barometer of industry, and no doubt after it has ceased to be a popular illuminant or a source of power it will live invaluable as the thing which lets the wheels go round. Its greatest popularity now arises out of its use in the internal-combustion engine, and of the making of these there is no end. It draws railroad trains and drives street cars. It pumps water, lifts heavy loads, has taken the place of millions of horses, and in 20 years has become a farming, industrial, business, and social necessity. The naval and the merchant ships of this country and of England are fitted and being fitted to use it either under steam boilers as fuel or directly in the Diesel engine. The airplane has been made possible by it. It propels that modern juggernaut, the tank. In the air it has no rival, while on land and sea it threatens the supremacy of its rivals whenever it appears. There has been no such magician since the day of Aladdin as this drop of mineral oil. Medicines and dyes and high explosives are distilled from it. No one knows whence it cometh or whither it goeth. Men search for it with the passion of the early Argonauts, and the promise now is that nations will yet fight to gain the fitful bed in which it lies.

In Persia and in Palestine, in Java and in China, in southern Russia and in Rumania we know that petroleum is, for it has been found there. How great these fields or others in Europe, Asia, or Africa may be no one would dare to say. As yet, however, the petroleum of the world has come from this hemisphere.

The "oil spring" which George Washington found in western Virginia and by his last will called to the especial consideration of his trustees was the promise of a continental well which last year yielded 356,000,000 barrels. Each year has seen the prophecy unfulfilled that the peak of the possible yield had been reached.

From the mountains of western Pennsylvania into the very ocean bed of the Pacific and even beyond and into the broken strata of upturned Alaska, the oil prospector bored with his sharp tooth of steel and found oil. Hardly has one field fallen into a decline when another has come rushing into service. Only three years ago and all hopes were centered in Oklahoma, and then came Kansas, and then the turn went south again to Texas, and now it looks toward Louisiana. Geologists have estimated and estimated, and they do not differ widely, for few give more than thirty years of life to the petroleum sands of this country if the present yield is insisted upon. And yet there is so much of mystery in the hiding of this strange subterranean liquid that honest men will not say but that it will become a permanent factor in the world of light, heat, and power. If this is not so we are a fatuous people, for with every fifth man in the country the owner of an automobile and the expenditure of hundreds of millions of dollars for roads fit only for their use, and with ships by the hundred specially constructed to burn oil, we have surely given a large fortune in pledge of our faith that our pools of petroleum will not soon be drained dry, or that others elsewhere will come to our help.

In 1908 the country's production of oil was 178,500,000 barrels, and there was a surplus above consumption of more than 20,000,000 barrels available to go into storage. In 1918, 10 years later, the oil wells of the United States yielded 356,000,000 barrels—nearly twice the yield of 1908—but to meet the demands of the increased consumption more than 24,000,000 barrels had to be drawn from storage. The annual fuel-oil consumption of the railroads alone has increased from $16\frac{2}{3}$ to $36\frac{3}{4}$ million barrels; the annual gasoline production from 540,000,000 gallons in 1909 to 3,500,000,000 gallons in 1918. This reference to the record of the past may be taken not only as justifying the earlier appeal for Federal action, but as warranting deliberate attention to the oil problem of to-day.

Fuel oil, gasoline, lubricating oil—for these three essentials are there no practical substitutes or other adequate sources? The obvious answer is in terms of cost: the real answer is in terms of man power. Whether on land or sea, fuel oil is preferred to coal because it re-

quires fewer firemen, and back of that, in the man power required in its mining, preparation, and transportation the advantage on the side of oil is even greater. So, too, the substitute for gasoline in internal-combustion engines, whether alcohol or benzol, means higher cost and larger expenditure of labor in its production.

There are large bodies of public land now withdrawn, which, under the new leasing bill which seems so near to final passage after seven years of struggle and baffled hope, will in all likelihood make a further rich contribution to the American supply.

OIL SHALE.

And beyond these in point of time lie the vast deposits of oil shale which by a comparatively cheap refining process can be made to yield vastly more oil than has yet been found in pools or sands. The value of this oil shale will depend upon the cheapness of its reduction, and this must be greatly lessened by the value of by-products before it can compete with coal or the oil from wells. There is every reason to believe, however, that some day the production of oil from shale will be a great and a permanent industry. And the country could make no better immediate investment than to give a large appropriation for the development of an economical shale-reducing plant.

So conservative an authority as the Geological Survey estimates that the oil shales of the Western States alone contain many times over the quantity of oil that will be recovered from our oil wells. The retorting of oil from oil shale has been a commercial industry for many years in Scotland and France; in fact, oil was obtained from oil shale here in the United States before the first oil well was drilled. The industry is in process of redevelopment to-day and if successful will assure us of a future supply, but at the best it will take years of time and a vast investment of capital to build up the industry to such a point that it can supply any considerable proportion of our needs. It is imperative, however, that the development of this latent resource be furthered and brought to a state of commercial development as soon as possible.

SAVE OIL.

Yet with all the optimism that can be justified I would urge a policy of saving as to petroleum that should be rigid in the extreme. If we are to long enjoy the benefits of a petroleum age, which we must frankly admit fits into the comfort-loving and the speed-loving side of the American nature, we must save this oil.

We must save it before it leaves the well; keep it from being lost; keep it from being flooded out, driven away by water. Through the cementing of wells in the Cushing field, Oklahoma, the daily volume of water lifted from the wells was decreased from 7,520 barrels to 628 barrels, while the daily volume of oil produced was increased

from 412 barrels to 4,716. These instances show what can and should be done in our known oil fields.

We must save the oil after it leaves the well, save it from draining off and sinking into the soil, save it from leaking away at pipe joinings, save it from the wastes of imperfect storage.

Then we come to the refining of the oil. How welcome now would be the knowledge that we could recover what was thrown away when kerosene was petroleum's one great fraction. (The loss in refineries is still startling, some 14,556,000 barrels last year—4½ per cent of the crude run in the refineries.)

The self-interest of the American refiner, notably the Standard Oil Co., has done a work that probably no mere scientific or noncommercial impulse could have equaled, in torturing out of petroleum the secrets of its inmost nature. And yet the thought will not altogether give place that in that residue which goes to the making of roads or to be burned in some crude way there may be things chemical that will work largely for man's betterment. This is the fact, too—that where the oil is produced by some small companies which have not the financial ability to make it yield its full riches there is a greater danger of loss of this kind. It would be well indeed if there could be such regulation as would require that all petroleum must be refined. That this is done generally is not denied. It should be universal. And all the skill and study and knowledge of the ablest of chemists and mechanicians should find themselves challenged by the problem of petroleum.

Coming to the use of petroleum in its various forms we find a field of promise. The engine that doubles the number of miles that can be made on a gallon of gasoline doubles our supply. There is where we can apply the principle of true conservation—find how little you need; use what you must, but treat your resource with respect. Has the last word been said as to the carburetor? Mechanical engineers do not think so. Have all possible mixtures which will save oil and substitute cheaper and less rare combustibles therefor been tried? Men by the hundred are making these experiments, and almost daily the quack or the stock promoter comes forward with the announcement of a discovery which proves to be a revelation—a revelation of human stupidity or criminal cupidity. On this line the men of science do not sing a song of the richest hope; they shrug their shoulders, exclaiming with uplifted hands: "Well, may be, may be."

There are possible substitutes for some petroleum products, but not for the whole barrel of oil; furthermore, petroleum is the cheapest material, speaking quantitatively, from which liquid fuels and lubricants can be made; therefore, any substitutes obtained in quantity must cost more. Alcohol can be substituted for gasoline, but

only in limited quantity and at increased cost. Benzol from by-product coking ovens also can be used, but quantitatively is totally inadequate. For kerosene no quantitative substitute is known. Lubricants can be obtained from animal and vegetable fats, but mostly are inferior in quality, and there seems no hope of obtaining them in quantity. Fuel oil can be largely supplanted by coal, but for the internal-combustion engine there is no quantitative substitute.

USE THE DIESEL ENGINE.

We have ventured on a great shipbuilding program. Our people are to once again respond to the call of the sea. On private ways and on Government ways ships are being built to go round the world—ships that are to burn oil under boilers and produce steam. I presume that there is a justification for this policy, perhaps one that is as good, if not better, than can be made for the railroads of the West pursuing the same policy. I submit, however, that there should be justification shown for the construction of any oil-burning ship which does not use an engine of the Diesel type. To burn oil under a boiler and convert it into steam releases but 10 per cent of the thermal units in the oil, whereas if this same fuel oil were used directly in a Diesel engine, 30 to 35 per cent of the power in the oil would be secured. Substitute the internal-combustion engine for the steam boiler and we multiply by three or three and one-half the supply of fuel oil in the United States. Instead of our fuel-oil supply being, let us say, 200,000,000 barrels, it would at once rise to 600,000,000 barrels or 700,000,000. I recognize that this is an impractical and unrealizable hope as applied to things as they are, but there is no reason why this should not be a very definite policy as to things that are to be.

This Government might itself well undertake to develop an engine of this type for use on its ships, tractors, and trucks. We simply can not afford to preach economy in oil when we do not promote by every means the use of the internal-combustion engine for its consumption. No other one thing that can be done by the Government, our industries, or the people will save as much oil from being wasted and thereby multiply the real production of the United States. If such engines are delicate of handling and need specially trained engineers, which appears to be the fact, there should be little difficulty experienced in training men for such work. A nation that could educate 10,000 automobile mechanics in 60 days might indeed develop 1,000 Diesel engineers in a year. The matter is of too great moment for delay. It touches the interest of everyone. We are in the petroleum age, and how long it will last depends upon our own foresight, inventiveness, and wisdom.

WANTED—A FOREIGN SUPPLY.

Already we are importers of petroleum. We are to be larger importers year by year if we continue—and we will—to invent and build machines which will rely upon oil or its derivatives as fuel. Our business methods have been and doubtless will continue to be developed along lines that make a continuing oil supply a necessity. Some of that oil must come from abroad, as nearly 40,000,000 barrels did last year, and for that we must compete with the world. For while we are the discoverers of oil and of the methods of securing it and refining it, piping it, and using it, our pioneering is but a service unto the world.

This situation calls for a policy prompt, determined, and looking many years ahead. For the American Navy and the American merchant marine and American trade abroad must depend to some extent upon our being able to secure, not merely for to-day but for to-morrow as well, an equal opportunity with other nations to gain a petroleum supply from the fields of the world. We are now in the world and of it in every possible sense, otherwise our Navy and our merchant fleet would have no excuse. No one needs to justify them—they are the expression of an ambition that carries no danger to any people. For their support we can ask no preference, but in their maintenance we can insist that they shall not be discriminated against.

Sometime since I presented to a board of geologists, engineers, and economists in this department this question:

If in the next five years there should develop a new demand for petroleum over and above that now existing, which would amount to 100,000,000 barrels a year, where could such a supply be found, and what policy should be adopted to secure it?

The conclusions of this board may be summarized as follows:

- (1) Such an oil need could not be met from domestic sources of supply.
- (2) It could not be assured unless equal opportunities were given our nationals for commercial development of foreign oils.
- (3) Assurance of this oil supply therefore inevitably entails political as well as commercial competition with other nationals, as other nationals controlling foreign sources of supply have adopted policies that discriminate against, hinder, and even prevent our nationals entering foreign fields.
- (4) The encouragement of and effective assistance to our nationals in developing foreign fields is essential to securing the oil needed.
- (5) Commercial control by our nationals over large foreign sources of supply will be essential if the estimated requirements are to be assured.
- (6) It is necessary that all countries be induced to abandon or adequately modify present discriminatory policies and that the interest of our nationals be protected.
- (7) Some form of world-wide oil-producing, purchasing, and marketing agency fostered by this Government seems essential to assure the commercial control over sufficient resources to meet the competition of other nationals. England has apparently adopted such a policy.

This board proposed the following program of action:

(1) To secure the removal of all discriminations to the end that our nationals may enjoy in other countries all the privileges now enjoyed by other nationals in ours:

(a) By appropriate diplomatic and trade measures.

(b) By securing equal rights to our nationals in countries newly organized as mandatories.

(2) To encourage our nationals to acquire, develop, and market oil in foreign countries:

(a) By assured adequate protection of our citizens engaged in securing and developing foreign oil fields.

(b) By promotion of syndication of our nationals engaged in foreign business, in order to effectually conduct oil development and distribution of petroleum and its products abroad.

(3) Governmental action—through special agency or board:

(a) Through the organization of a subsidiary governmental corporation with power to produce, purchase, refine, transport, store, and market oil and oil products.

(b) Through the formation of a permanent petroleum administration.

(4) To assure to our nationals the exclusive opportunity to explore, develop, and market the oil resources of the Philippine Islands, provided discriminatory policies of other nations against our nationals are not abandoned or satisfactorily modified.

I have given much thought during the past year to this problem of adding to our petroleum supply, and it has seemed to me but fair that we should first make every effort to increase the domestic supply through the methods that have been indicated—

(1) The saving of that which is now wasted, below ground and above ground.

(2) The more intensive use, through new machinery and devices, of the supply which we have.

(3) The development of oil fields on our withdrawn territory and in new areas such as the Philippines.

In addition, we must look abroad for a supplemental supply, and this may be secured through American enterprise if we do these things:

(1) Assure American capital that if it goes into a foreign country and secures the right to drill for oil on a legal and fair basis (all of which must be shown to the State Department) that it will be protected against confiscation or discrimination. This should be a known, published policy.

(2) Require every American corporation producing oil in a foreign country to take out a Federal charter for such enterprise under which whatever oil it produces should be subject to a preferential right on the part of this Government to take all of its supply or a percentage thereof at any time on payment of the market price.

(3) Sell no oil to a vessel carrying a charter from any foreign government either at an American port or at any American bunker

when that government does not sell oil at a nondiscriminatory price to our vessels at its bunkers or ports.

The oil industry is more distinctively American than any other of the great basic industries. It has been the creation of no one class or group but of many men of many kinds—the hardy, keen-eyed prospector with a “nose for oil” who spent his months upon the deserts and in the mountains searching for seepages and tracing them to their source; the rough and two-fisted driller, a man generally of unusual physical strength, who handled the great tools of his trade; the venturesome “wildcatter,” part prospector, part promoter, part operator, the “marine” of the industry, “soldier and sailor too”; the geologist who through his study of the anatomy of the earth crust could map the pools and sands almost as if he saw them; the inventor; the chemist with still and furnace; the genius who found that oil would run in a pipe—these and many more, in most of the sciences and in nearly all of the crafts, have created this American industry. If they are permitted they will reveal the world supply of oil. And upon that supply the industries of our country will come to be increasingly dependent year by year.

BY WAY OF SUMMARY.

It would seem to be our plain duty to discover how little coal we need to use. To do this we must dignify coal by grading it in terms not merely of convenience as to size, but in terms of service as to its power. We should save it, if for no better reason than that we may sell it to a coal-hungry world. We should develop water power as an inexhaustible substitute for coal and if necessary compel the coordination of all power plants which serve a common territory. New petroleum supplies have become a national necessity, so quickly have we adapted ourselves to this new fuel and so extravagantly have we given ourselves over to its adaptability. To save that we may use abundantly, to develop that we may never be weak, to bring together into greater effectiveness all power possibilities—these would seem to be national duties, dictated by a large self-interest.

I have gone only sufficiently far into this whole question to realize that it is as fundamental and of as deep public concern as the railroad question and that it is even more complex. No one, so far as I can learn, has mastered all of its various phases; in fact, there are few who know even one sector of the great battle front of power. A Foch is needed, one in whom would center a knowledge of all the activities and the inactivities of these three great industries, which in reality are but a single industry. We should know more than we do, far more about the ways and means by which our unequalled wealth in all three divisions can be used and made interdependent, and the moral and the legal strength of the Nation should be behind a studied, fact-based, long-viewed plan to make America the

home of the cheapest and the most abundant and the most immediately and intimately serviceable power supply in the world. If we do this, we can release labor and lighten nearly every task. We will not need to send the call to other countries for men, and we can distribute our industries in parts of the country where labor is less abundant and where homes will take the place of tenements. One could expand upon the benefits that would come to this land if a rounded program such as has been but skeletonized here could be carried out. I am convinced that within a generation it will be effected, because it will be necessary.

The simple steps now obviously needed are to pass those primary bills which are already before Congress or are here suggested. But beyond this there is imperative need that some one man (an assistant secretary in this department would serve)—some one man with a competent staff and commanding all the resources of this and other departments of the Government shall be given the task of taking a world view as well as a national view of this whole involved and growing problem, that he may recommend policies and induce activities and promote cooperative relationships which will effect the most economical production of light, heat, and power, which is more than the first among the immediate practical problems of science, as Sir William Crookes said, for it is foremost among the immediate practical problems of national and international statesmanship.

LAND DEVELOPMENT.

I wish now to ask consideration for another matter of home concern to which I gave attention in my last report and as to which the intervening year has strengthened and perhaps broadened my ideas—the development of our unused lands.

It was never more vital to the welfare of our people that a creative and out-reaching plan of developing and utilizing our natural resources should go bravely forward than it is to-day. Ours is a growing country, and as its social and industrial superstructure expands its agricultural foundation must be broadened in proportion. The normal growth of the United States now requires an addition of 6,300,000 acres to its cultivable area each year, which means an average increase of 17,000 acres a day.

Fortunately, the opportunity for this essential expansion exists not only in the West, where much of the public domain is yet unoccupied, but in every part of the Republic. We have a great fund of natural resources in the very oldest States, from Maine to Louisiana, which invite and would richly reward the constructive genius of the Nation. It is claimed by those who have specialized for years on the subject of reclamation that the control and utilization of flood waters now wasted would produce within the next 10 years more

wealth than the entire cost to the United States of the war with Germany.

After every other war in our history the work of internal development has gone forward by leaps and bounds, and our people have thus quickly made good the economic wastes of the conflict. The needs of to-day are different from those of the past and require different treatment, but they are by no means beyond the reach of enlightened thought and action.

More than a year ago we began an earnest discussion of reconstruction policies, particularly with respect to the land. But nothing has been done. Not one line of legislation, not one dollar of money has been provided except in the way of preliminary investigation. We stand voiceless in the presence of opportunity and idle in the face of urgent national need.

A PROGRAM OF PROGRESS.

The great work of material development accomplished in the past has been done very largely by private capital and enterprise. Doubtless this must be the chief reliance for progress in the future. We should realize, however, that this method has involved losses as well as gains, for the Nation has sometimes been too prodigal in offering its natural resources as an inducement to private effort. Not only so, but with the exhaustion of the free public lands in our great central valleys—the most remarkable natural heritage that ever fell into the lap of a young nation—conditions of home making and settlement have radically changed.

There can be no doubt that there is an important sphere of action which the Government must occupy if we are to go steadily forward with the work of continental conquest, and all it implies to the future of the Nation, but in suggesting practicable steps of progress at this time I do not forget the burden of taxation which confronts our people nor the delicate and difficult task which Congress is called upon to perform in trying to keep the national outgo within the national income. Hence, I am now suggesting such constructive things as the Government may be able to do through the exercise of its powers of supervision and direction and with the smallest possible outlay of money.

Under this head I put, first, the matter of suburban homes for wage earners; second, reclamation of desert, overflow, and cut-over areas, together with improvement of abandoned farms, under a system of district organization which may be made to finance itself; third, cooperation with various States in the work of internal development.

GARDEN HOMES FOR THE PEOPLE.

There is no more baffling problem than that presented by the continued growth of great cities, but it is a problem with which we must

sometime deal. It bears directly on the high cost of living and is, indeed, largely responsible for it. Rent is based on land values. Land values rise with increasing population. The price of food is closely related to the growing disproportion between consumers and producers, resulting from urban congestion.

Here is Washington, a city of some 400,000 people, doubtless destined steadily to grow until—a Member of Congress predicts—it may touch 2,000,000 twenty years hence. Already the housing problem is acute, as it is in almost every other large American city. It would be a pitiful thing if the provision of more housing facilities to meet the needs of growing population meant merely more congestion and higher rents, with an ever-decreasing degree of landed proprietorship and true individual independence. Such conditions, it seems to me, undermine the American hearthstone and carry a deep menace to the future of our institutions. I believe there must be a better way, and that the time has come when we should make an earnest effort to find it.

Within a 10-mile circle drawn around the Capitol dome are thousands of acres of good agricultural land, of which the merest fraction has been reduced to intensive cultivation. Much of it is wastefully used, and much of it is not used at all. Conditions of soil, climate, and water supply are good and represent a fair average for the United States. Suburban transportation is a serious problem in some localities and less so in others, but tends to become more simple with the extension of good roads and increasing use of motor vehicles, including the auto bus.

Somewhere and sometime, it seems to me, a new system must be devised to disperse the people of great cities on the vacant lands surrounding them, to give the masses a real hold upon the soil, and to replace the apartment house with the home in a garden. Such a system should enable the ambitious and thrifty family not only to save the entire cost of rent, but possibly half the cost of food, while at the same time enhancing its standard of living socially and spiritually, as well as economically.

It has been suggested that there is no better place to demonstrate a new form of suburban life than here at the National Capital, where we may freely draw upon all the resources of the governmental departments for expert knowledge and advice and where the demonstration can readily command wide publicity and come under the observation of the Nation's lawmakers. And I am expecting that this experiment will be made. Such a plan of town or community life, rather than city life, should be extended to every other large city in the Nation. A simple act of legislation, accompanied by a moderate appropriation for organization and educational work, would enable the department to put its facilities at the service of local communities and of the industries throughout the United

States. This form of national leadership would be of value both to investors in the local securities and to the home builders themselves. If the work of land acquisition and construction, together with the organization of community settlements resulting therefrom, were conducted under the supervision of the State or the Federal Government it would safeguard the character of the movement from every point of view.

Therefore, I put first among the constructive things which may be done by the exercise of the Government's power of supervision and direction, with the smallest outlay of money, this matter of providing suburban homes for our millions of wage earners.

RECLAMATION BY DISTRICT ORGANIZATION.

The provision of garden homes for millions of city workers will contribute largely to the Nation's food supply and become in time a most effective influence in reducing excessive cost of living for many of our people. It will not, of course, solve the problem of increasing the number of farms and the area of cultivation to meet the needs of growing population. Neither will it enable us to expand our home market rapidly and largely enough to keep the country on an even keel of prosperity.

We must go forward with the development of natural resources as we have done for the past three centuries. And we must recognize at the outset that conditions have changed with the depletion of the public domain to the point where it offers comparatively little in the way of cultivable lands.

We have now to deal principally with lands in private ownership. This calls for a new point of view and for the application of a somewhat different principle than that which has governed our reclamation policy heretofore. Moreover, reclamation is no longer an affair of one section of the United States. The day has come when it must be nationalized and extended to all parts of the Republic.

To the deserts of the West we have brought the creative touch of water, and we must find a way to go on with this work. But it is of equal importance that we should liberate rich areas now held in bondage by the swamp, convert millions of acres of idle cut-over lands to profitable use, and raise from the dead the once vigorous agricultural life of our abandoned farms.

One more fundamental consideration—we have outlived our day of small things. Whether we would or not, we are compelled by the inexorable law of necessity arising out of existing physical conditions to cooperate, to work together, and to employ large-scale operations, and on this principle we should move: Not what the Government can do for the people, but what the people can do for themselves under the intelligent and kindly leadership of the Government.

We have an instrument at hand in the Reclamation Service which has dealt with every phase of the problem which now confronts us, and with such high average success as to command the entire confidence of Congress and the country. It has turned rivers out of their natural beds, reared the highest dams in existence, transported water long distances by every form of canal, conduit, and tunnel, installed electric power plants, cleared land, provided drainage systems, constructed highways and even railroads, platted townsites, and erected buildings of various sorts. In this experience, obtained under a variety of physical and climatic conditions, it has developed a body of trained men equal to any constructive task which may be assigned to it in connection with reclamation and settlement in any part of the country.

True economic reclamation is a process of converting liabilities into assets—of transforming dormant natural resources into agencies of living production. When such a process is intelligently applied it should be able to pay its own bills without placing fresh burdens on the national treasury. It is in the confident belief that such is actually the case that I suggest the policy of reclamation by means of local districts, financed on the basis of their own credit but with the fullest measure of encouragement and moral support of the Government, practically expressed through the Reclamation Service.

In this connection it seems worth while to recall that with a net expenditure of \$119,000,000 the Reclamation Service has created taxable values of \$500,000,000 in the States where it has operated. The ratio is better than three to one, and that is a wider margin of security than is usually demanded by the most conservative banking methods. There is no reason to doubt that the overflow lands of the South, the cut-over areas of the Northwest, and the abandoned farm districts of New England and New York and other States would do quite as well as the deserts of the West if handled by such an organization.

What is the legitimate function of the Government in connection with reclamation districts to be financed entirely upon their own credits without the aid of national appropriations? I should say that the Government, with great advantage to the investor, the land-owner, the future settler, and the general public, might do these things:

1. Employ its trained, experienced engineers, attorneys, and economists in making a thorough investigation of all the factors involved in a given situation, to be followed by a thorough official report upon the district proposed to be formed.

2. Offer the district securities for public subscription in the open market. This, of course, would follow the actual organization of the

district and the approval of its proceedings by the Government's legal experts.

3. Construct the works of reclamation with proceeds of district bond sales, and administer the system until it becomes a "going concern," when it may be safely confided to its local officers.

The most obvious advantage of Government cooperation is the fact that it would assure the service of a body of engineers, builders, and administrators trained in the actual work of reclamation. This advantage, as compared with the management that might be had in a sparsely settled local district, would often make all the difference between success and failure. Unquestionably it would materially reduce the interest rate on district bonds and greatly facilitate their sale in the open market.

There are other advantages less obvious but really more important. Experience has shown that great enterprises can best be handled under centralized control. This control, to be effective, must extend from the initiation to the completion of the project. There can be no assurance of this when the management is left to the electorate of a local district, and without such assurance it is difficult to command the support, first, of the landowners whose consent is essential to the formation of the district; next, of the investors who must supply the money; finally, of the settlers who must purchase and develop the land in order that the object of the enterprise may be realized. The Government can give the assurance of precisely that quality of unified, centralized, permanent, and responsible control that is required to command the confidence of all the factors in the situation.

There is another advantage of Government cooperation that will inure greatly to the benefit of the settler. The Government may readily apply the policy it now uses in connection with privately owned lands within reclamation projects. It requires the owners to enter into a contract by which they agree to accept a certain maximum price for their land if sold within a given period of years. This price is based upon the value of the land before reclamation. There are many instances, particularly of swamp and cut-over areas, where land that may be bought for \$10 an acre and reclaimed at a cost of \$25 to \$50 per acre, has an actual market value of \$100 to \$200 per acre the moment it is put into shape for cultivation. If the Government, by means of a contract with the local district, undertakes the work of reclamation and settlement and does this work at actual cost, the settler will generally save enough to pay for all his improvements and equipment.

The crowning consideration is the fact that, because of all these advantages, the work of reclamation would actually be accomplished, while to-day it is not being done except in the far West, and accomplished without the aid of Government appropriations.

SOLDIER-SETTLEMENT LEGISLATION.

In the foregoing, attention has been called to those things which may be accomplished by the exercise of the Government's powers of supervision and direction with the smallest outlay of money. In all this I have been speaking of reclamation for the sake of reclamation.

The proposed soldier-settlement legislation stands on an entirely different footing. The primary object is not to reclaim land but to reward our returned soldiers with the opportunity to obtain employment and larger interest in the proprietorship of the country. The policy is based on a sense of gratitude for heroic service, not on economic considerations. This is the answer to those who have criticized it as class legislation or the proposal to grant special privileges to one element of our citizenship or as a plunge into socialism. Frankly, we avow our purpose to do for the soldier what we would not think of doing for anybody else and what would not be justified solely as a matter of reclamation.

Many measures of soldier legislation have been introduced into Congress. Only one of these has been favorably reported. This was introduced by Representative Mondell, of Wyoming, on the first day of the present special session, embodying the plan of reclamation and community settlement brought forward by this department in the spring of 1918.

The measure has been much misunderstood and sometimes deliberately misrepresented. In the first place, it was not put forward as the complete solution of the soldier problem. It was at no time supposed or expected that all of the 4,800,000 men and women engaged in the war with Germany would or could take advantage of its provisions. It fortunately happens that the vast majority quickly found their places in the national life. Of the remainder, a very large proportion may be classified as "city minded." They have no taste for farm life but would be better served by vocational training and opportunities to enter upon remunerative trades or professions. There is an element of "country minded," and of these some 150,000 have made application for opportunities of employment and home-making under the terms of this bill. Largely they are men who have had agricultural experience but who can not obtain farms of their own without very considerable cash advances and other assistance which the Government could render. It is for this element that the policy is designed.

It has often been said that the plan would be applied only in the West and South. The truth is that it has been the purpose from the first to extend it to every State where feasible projects

could be found, and that our preliminary investigations lead us to believe this will include every State in the Union.

The wide discussion of the measure has been highly educational to the country, and some of the criticism is of constructive character. For example, attention has been sharply called to the fact that in certain localities there are individual farms well suited to our purpose which may often be had at a price representing rather less than the value of their improvements. These are the so-called "abandoned farms" so numerous in the Northeastern States. In some cases they are interspersed with land now cultivated, so situated that it is not possible to bring together a large number of contiguous farms as the basis of a Government project.

In New England and elsewhere public sentiment strongly favors a modification of the pending measure which will enable the purchase of individual farms rather than community settlement. This would be practicable only in localities where a sufficient number of farms, even if not contiguous, could be had to make possible the necessary supervision and instruction, together with cooperative organization for the purchase of supplies and sale of products. Without these advantages the plan of soldier settlement would fail in many instances. My information is that these conditions could be met. Not only so, but it is urged that existing farm communities would be inspired by the presence of soldier settlers and benefited by the presence of soldier settlers by their cooperative buying and selling agencies.

Another criticism of the pending measure is directed to the amount of the first payment the soldier settler is required to make. As the bill now stands it calls for 5 per cent on the land, 25 per cent on improvements and live stock, and 40 per cent on implements and other equipment. It has been urged by some friends of soldier settlement that no first payment should be required, but that the Government should make advances of 100 per cent in view of the soldiers' peculiar claim upon national consideration. It might be feasible to do this in the case of community settlements. But it could not be done in the case of scattered and individual farms, at least without abandoning the principles of sound business.

In the case of community settlement the soldier literally "gets in on the ground floor." Starting with a territory that is entirely blank so far as homes and improvements are concerned, he finds himself in a place where community values remain to be created. When he buys an improved farm in a settled neighborhood the situation is precisely reversed. In both cases there is or will be "unearned increment," or society-created values; but in the one case he *gets* the increment, while in the other case he *pays* it. Obviously, a larger advance would be justified in one case than in the other.

ALASKA.

One of the first recommendations made by me in my report of seven years ago was that the Government build a railroad from Seward to Fairbanks in Alaska. Five years ago you intrusted to me the direction of this work. The road is now more than two-thirds built, and Congress at this session, after exhaustively examining into the work, has authorized an additional appropriation sufficient for its completion. The showing made before Congress was that the road had been built without graft: every dollar has gone into actual work or material. It has been built without giving profits to any large contractors, for it has been constructed entirely by small contractors or by day's labor. It has been built without touch of politics: every man on the road has been chosen exclusively for ability and experience. It has been well and solidly built as a permanent road, not an exploiting road. It has been built for as little money as private parties could have built it, as all competent independent engineers who have seen the road advise.

Edwin F. Wendt, of the Interstate Commerce Commission, in charge of valuation of the railroads of the United States from Pittsburgh to Boston, after an investigation into the manner in which the Alaskan Railroad was constructed and its cost, reported to me as follows:

In concluding, it is not amiss to again state that after the full study which was given to the property during our trip, we are satisfied that the project is being executed rapidly and efficiently by men of experience and ability. It is believed that it is being handled as cheaply as private contractors could handle it under the circumstances.

The road has not been built as soon as expected because each year we have exhausted our appropriation before the work contemplated had been done. We could not say in October of one year what the cost of anything a year or more later would be, and we ran out of money earlier than anticipated. It has not been built as cheaply as expected because it has been built on a rising market for everything that went into its construction—from labor, lumber, food supplies, machinery, and steel to rail and ocean transportation. I believe, however, it can safely be said that no other piece of Government construction or private construction done during the war will show a less percentage of increase over a cost that was estimated more than four years ago.

The men have been well housed and well fed. Their wages have been good and promptly paid; there has been but one strike, and that was four years ago and was settled by Department of Labor experts fixing the scale of wages. The men have had the benefit of a system of compensation for damages like that in the Reclamation Service and Panama Canal. They have had excellent hospital service, and our

camps and towns have been free of typhoid fever and malaria. That the men like the work is testified by the fact that hundreds who "came out" the past two years, attracted by the high wages of war industries, are now anxious to return to Alaska.

There has been but one setback in the construction, and that was the washing out of 12 miles of tracks along the Nenana River. This is a glacial stream which, when the snows melt, comes down at times with irresistible force. In this instance it abandoned its long accustomed way and cut into a new bed and through trees that had been standing for several generations, tearing out part of the track which had been laid.

The work of locating and constructing the road has been left in the hands of the engineers appointed by yourself. The only instruction which they received from me was that they should build the road as if they were working for a private concern, selecting the best men for the work irrespective of politics or pressure of any kind. As a result, we have a force that has been gathered from the construction camps of the western railroads, made up of men of experience and proved capacity. That they have done their work efficiently, honestly, and at reasonable cost is my belief.

It is not possible during the construction of a railroad to tell what it costs per mile because all the foundation work, the construction of bases from which to work, the equipment for construction, and much of the material is a charge which must be spread over the entire completed line. The best estimate that can be made to-day as to the newly constructed road is that it has cost between \$70,000 and \$80,000 per main-line mile, or between \$60,000 and \$70,000 per mile of track.

This cost per mile includes the building of the most difficult and expensive stretch of line along the entire route from Seward to Fairbanks—that running along Turnagain Arm, which is sheer rock rising precipitously from the sea for nearly 30 miles. There are miles of this road which have cost \$200,000 per mile. Even to blast a mule trail in one portion of this route cost \$25,000 a mile.

The only Government-built railroad—that across the Isthmus of Panama—cost \$221,052 per mile. The only two recently built railroads in the United States are (1) the Virginian, built by H. H. Rogers, which cost exclusive of equipment \$151,000 per mile, with labor at from \$1.35 to \$1.75 per day and all machinery, fuel, rails, and supplies at its door, and (2) the Milwaukee line to Puget Sound, which is estimated as having cost \$130,000 per mile exclusive of equipment.

The work has been conducted with its main base at Anchorage, which is at the head of Cook Inlet. The point was chosen as the nearest point from which to construct a railroad into the Matanuska

coal fields. That was the primary objective of the railroad, to get at the Matanuska coal. From Anchorage it was also intended to drive farther north through the Susitna Valley and across Broad Pass, and to the south along Turnagain Arm toward the Alaska Northern track. To secure coal for Alaska was the first need. So in addition to Anchorage as a base, one was also started at Nenana, on the Tanana River, from which to reach the Nenana coal fields lying to the south. If these two fields were open, one would supply the coast of Alaska and one the interior. This program has been acted upon, with the result that the Matanuska field is open to tidewater with a down-grade road all the way. The Nenana road has been pushed far enough south to touch a coal mine near the track, which may obviate the immediate necessity for reaching into the Nenana field proper.

There is an open stretch across Broad Pass to connect the Susitna Valley with the road coming down from Nenana. This gap closed, there will be through connection between Seward and Fairbanks.

MATANUSKA COAL.

By decisions of the Commissioner of the Land Office all of the claims in the Matanuska coal field were set aside, and by act of Congress a leasing bill was put into effect over the entire field. Under this law a number of claims must be reserved to the Government. The field was surveyed, and some of the most promising portions of the field have been so reserved.

Two leases have been entered into by the Government, one with Lars Netland, a miner, who has a backer, Mr. Fontana, a business man of San Francisco, and the other with Oliver La Duke and associates. There are many thousands of acres in this field which are open for lease and which will be leased to any responsible parties who will undertake their development. Government experts who have examined this field do not promise without further exploring a larger output of coal from this field than 150,000 tons a year.

The population of Alaska has fallen off during the war. She sent, I am told, 5,000 men into the Army, the largest proportion to population sent by any part of the United States. The high cost of labor and materials closed some of the gold mines, and the attractive wages offered by war industries drew labor from Alaska to the mainland. All prospecting practically closed. But with the return of peace there is evidence of a new movement toward that Territory which should be given added confidence in its future by the completion of the Alaskan Railroad. There is enough arable land in Alaska to maintain a population the equal of all those now living in Norway, Sweden, and Finland, and all that can be produced in those countries can be produced in Alaska. The great need is a market, and this will be found only as the mining and fishing industries of the country develop.

SAVE AND DEVELOP AMERICANS.

When the whole story is told of American achievement and the picture is painted of our material resources, we come back to the plain but all-significant fact that far beyond all our possessions in land and coal and waters and oil and industries is the American man. To him, to his spirit and to his character, to his skill and to his intelligence is due all the credit for the land in which we live. And that resource we are neglecting. He may be the best nurtured and the best clothed and the best housed of all men on this great globe. He may have more chances to become independent and even rich. He may have opportunities for schooling nowhere else afforded. He may have a freedom to speak and to worship and to exercise his judgment over the affairs of the Nation. And yet he is the most neglected of our resources because he does not know how rich he is, how rich beyond all other men he is. Not rich in money—I do not speak of that—but rich in the endowment of powers and possibilities no other man ever was given.

Twenty-five per cent of the 1,600,000 men between 21 and 31 years of age who were first drafted into our Army could not read nor write our language, and tens of thousands could not speak it nor understand it. To them the daily paper telling what Von Hindenberg was doing was a blur. To them the appeals of Hoover came by word of mouth, if at all. To them the messages of their commander in chief were as so much blank paper. To them the word of mother or sweetheart came filtering in through other eyes that had to read their letters.

Now this is wrong. There is something lacking in the sense of a society that would permit it in a land of public schools that assumes leadership in the world.

Here is raw material truly, of the most important kind and the greatest possibility for good as well as for ill.

Save! Save! Save! This has been the mandate for the past two years. It is a word with which this report is replete. But we have been talking of food and land and oil while the boys and young men that are about us who carry the fortune of the democracy in their hands are without a primary knowledge of our institutions, our history, our wars and what we have fought for, our men and what they have stood for, our country and what its place in the world is.

The marvelous force of public opinion and the rare absorbing quality of the American mind never was shown more clearly than by the fact that out of these men came a loyalty and a stern devotion to America when the day of test came. Had Germany known what we know now, it would have been beyond her to believe that America could draft an army to adventure into war in Europe. There should not be a man who was in our Army or our Navy who has the ambi-

tion for an education who should not be given that opportunity—indeed, induced to take it—not merely out of appreciation but out of the greater value to the Nation that he would be if the tools of life were put into his hand. There is no word to say upon this theme of Americanization that has not been said, and Congress, it is now hoped, will believe those figures which, when presented nearly two years ago, were flouted as untrue. The Nation is humiliated at its own indifference, and action must be the result.

To save and to develop, I have said, were equally the expression of a true conservation. What is true as to material things is true as to human beings. And once given a foundation of health there is no other course by which this policy may be effected than to place at the command of every one the means of acquiring knowledge. The whole people must turn in that direction. We should enable all, without distinction, to have that training for which they are fitted by their own natural endowment. Then we can draw out of hiding the talents that have been hidden. The school will yet come to be the first institution of our land, in acknowledged preeminence in the making of Americans who understand why they are Americans and why to be one is worth while.

Respectfully, yours,

FRANKLIN K. LANE,
Secretary.

The PRESIDENT.

ADMINISTRATIVE EFFORT.

THE GENERAL LAND OFFICE.

1. Allowed during the fiscal year original entries of Indian and public lands 11,871,181.50 acres, an increase of 1,896,849.89 acres over the area entered and allowed during the fiscal year 1918.
2. Patented during the fiscal year an area of 10,777,001.349 acres, an increase over the fiscal year of 1918 of 1,224,519.132 acres.
3. Collected from all sources during the year \$4,303,674.20, and expended during the same time in the public land service, \$3,026,554.46, leaving a net surplus of receipts over expenditures of \$1,277,119.74.
4. Collected and turned into the United States Treasury as the result of the work of the field service, \$101,298.96.
5. Restored to the public domain as the result of investigation in the field, 164,363.83 acres.
6. Secured as escrow deposits, under contracts entered into with oil-land claimants under the act of August 25, 1914 (38 Stat., 708), up to the end of the fiscal year, \$4,325,005.84.
7. Secured as escrow deposits by operators under oil-land leases from the State of Wyoming, \$2,119,306.58.

8. Obtained judicial decree quieting title in the United States to 617 acres of oil-producing lands in the State of Louisiana, with an award of \$462,903.39 for oil taken in trespass.

9. Obtained a judicial decree quieting title in the United States to 54,000 acres of Arkansas "Sunk lands," of the value of \$2,700,000.

10. Approved and accepted surveys and resurveys covering an area of 7,668,514 acres.

11. Approved for patent 40,131 homestead and kindred entries, as against 32,120 the year previous.

12. Allowed 15,037 stock-raising homestead entries covering an area of 5,559,235 acres.

13. Secured the withdrawal for stock driveway purposes, under the grazing homestead act, 4,303,727 acres. The total area thus withdrawn at present is 6,623,531 acres.

14. Promulgated administrative ruling of June 13, 1919, discontinuing the application of the rule of approximation in the location of soldiers' additional homestead rights.

15. Received from the sale of town lots outside of Alaska, \$112,871.30.

16. Received from the sale of town lots in Alaska, \$31,474.91.

17. Patented under the Carey Act, 85,699 acres.

18. Patented 1,675 desert-land entries, embracing 267,065 acres.

19. Patented 653 final reclamation homestead entries.

20. Certified under State grants as school indemnity, and for other purposes, 1,628,834 acres.

21. Eliminated from national forests 21,267 acres of school-section lands by exchange for other lands through cooperative agreements with the grantee States.

22. Secured an agreement with the State of Washington for the institution of legal proceedings by which a decision may be obtained as to the applicability of the provisions of the act of February 28, 1891 (26 Stat., 796), to the school grant of the State; action on 85,000 acres of selections remaining suspended in the meantime.

23. Patented under railroad grants 632,284 acres.

24. Completed the classification of the revested lands embraced in the former grant to the Oregon & California Railroad Co. so far as susceptible of such action at the present time.

25. Surveyed 182,000 acres of land embraced in the Oregon and California grant as a prerequisite to the adjustment thereof under the act of revestment.

26. Sold the timber on 2,875 acres of revested Oregon and California grant lands for the sum of \$96,497.83.

27. Received proposals for the exchange under the act of May 31, 1918, of approximately 80,000 acres of revested Oregon and California lands.

28. Issued 3,207 patents in fee to Indians for a total acreage of 410,529 acres.

29. Approved for patent under the Minnesota drainage act 1,118 entries, covering an area of 176,320 acres as against 146,240 acres the year previous. A total area of 766,920 acres has been patented under this act.

30. Approved for patent mineral entries covering 32,559.77 acres, for which \$137,381.09 was received, and coal entries for 7,843.17 acres, for which \$295,031.75 was received.

31. Secured a coal-land lease in the Bering River field for 2,080 acres, making a total of 4,500 acres under lease in that field, with 2,840 acres under lease in the Matanuska field.

32. Decided 10,017 litigated cases aside from mineral contests.

33. Investigated in the field and reported on 17,399 cases.

34. Obtained 14 convictions in criminal cases prosecuted during the year.

35. Received during the year 200 applications for permits to prospect for potash.

THE INDIAN OFFICE.

1. Under the "Declaration of Policy," of April, 1917, issued 10,956 fee patents, or 1,062 more than in the 10 years preceding, 4,376 of which were within the last year; broadened the policy to include those of one-half Indian blood. Instituted special measures for the rapid settlement of about 20,000 inherited estates.

2. Cites information showing that Indian soldiers gained great benefit from war service in white organizations and won distinction for individual valor.

3. Maintained efficiency in Indian schools under depletion of service caused by the war. Emphasized the policy of enrolling Indian children in public schools and requiring well-to-do parents and citizen Indians to pay the expense of their children's education, and amended school regulations with a view to reserving Government schools for Indians not well provided with such facilities.

4. Kept all health conditions among the Indians as nearly normal as was possible in view of extreme shortage of physicians and nurses requisitioned by the war, and combated in the main successfully the epidemic of Spanish influenza. Formulated plans for aggressive health work during the coming year, and will emphasize the prevention of disease through better housing, better water supplies, better bodily nutrition, and the practice of hygiene, sanitation, and well-ordered living.

5. Instituted during the year 1,516 new cases against illicit liquor traffic and disposed of 2,135. Seized and destroyed 33,924 gallons of intoxicants; libeled and sold 112 automobiles engaged in illegal traffic; and conducted prosecutions for violations of State, Federal, and municipal laws in 27 different States.

6. Continued farming, gardening, and stock raising among the Indians on a war-time basis of production, and secured greater use of agricultural machinery and improved methods of tillage. Stimulated high-grade cotton culture, improvement of stock breeds, and completed the eradication of contagious diseases among stock on several reservations in the Northwest.

7. Overcame high cost of all material, and the scarcity of labor in irrigation construction by greater use of mechanical appliances, such as dredges, excavators, and ditch cleaners. Extended irrigated areas in the Northwest, where the Yakima project, Washington, returned last year a value of \$9,000,000 in crops; installed additional wells to supply drinking water for live stock on the arid Indian lands of Arizona and New Mexico, and increased the sewerage and domestic water supply of some of the Indian pueblos.

8. Made 1,213 allotments to Indians of irrigable and nonirrigable land on the reservations, about 1,000 reallocations, under provision of law, and 315 allotments comprising 46,207 acres on the public domain. Sold 115,367 acres of Indian land for the highest average price ever received, \$25.65 per acre. Continued the leasing of surplus Indian lands with excellent results in the increase of general farm products.

9. Disbursed to individual Indians of the Five Civilized Tribes from land sales, equalization, royalties and per capita payments \$7,812,331.44, and supplied them houses, barns, improvements, and miscellaneous articles in the value of \$1,110,618.53. Sent a competency commission to the Creek Tribe to determine such as are capable of controlling their allotted land, and removed restrictions from 57,000 acres. To June 30, 1919, tribal land of the Five Civilized Tribes had been sold for \$20,376,096.27 and their unsold tribal property was worth approximately \$18,000,000. These nations made substantial gains in agriculture and stock raising during the year.

10. Sold 1,700,000,000 feet of timber from reservation forests; cut 30,000,000 feet under contract on the Red Lake Reservation, and extended the construction of roads and bridges on the reservations, largely through Indian labor.

11. The office probate work included appearance by attorneys in more than 7,000 regular cases, the final disposition of about 2,700 cases besides action on a large number of wills and some 3,000 miscellaneous matters.

12. Osage oil and gas leases were consummated for a consideration of \$11,473,820, in addition to royalties. The year's gross production of oil for this tribe numbered 12,138,086 barrels, and their revenue from oil and gas was approximately \$17,000,000. The restricted land of the Five Civilized Tribes yielded in the year 10,180,862 barrels of oil and \$4,073,985 from oil and gas. Other reservations in Oklahoma and farther west added extensive mineral returns to the foregoing.

13. Forty per cent of reimbursable funds loaned to Indians has been repaid and the remaining installments are well secured. Tribal herds purchased from such funds have been profitable.

14. The disbursement of individual funds to adult and minor Indians is proceeding with a liberal view to the emancipation of the Indian from Government control.

15. Active work is in progress in behalf of the Seminoles of Florida, the Alabama Indians in Texas, and the homeless bands of California.

16. The bureau is assisting the Department of Justice in important litigation now before the Supreme Court of the District of Columbia involving the title to practically all of the land within the present Papago Reservation.

THE BUREAU OF PENSIONS.

1. Paid for pensions, \$222,159,292.

2. Returned to the Treasury \$947,170.97 of the amount appropriated for the payment of pensions.

3. Returned to the Treasury \$118,419.86 of the sum appropriated for the maintenance and expense of the pension system, including salaries of special examiners.

4. Reduced the number of employees by 58.

5. Under the act of July 16, 1918, providing pensions to widows and minor children of officers and enlisted men who served in the War with Spain, Philippine insurrection, or in China, pensions have been granted to 992 widows, 72 minor children, and 1 helpless child. There are a number of claims still pending under this act.

6. Receipts for addresses, certified copies, etc. (act Aug. 24, 1912), \$2,153.70. Refundments to pension appropriations, \$6,890.05. Miscellaneous receipts, \$3,041.15.

THE PATENT OFFICE.

Granted—Patents on mechanical inventions.....	37, 259
Granted—Reissue patents.....	205
Granted—Design patents.....	1, 355
Registered—Trade-marks.....	3, 766
Registered—Labels.....	572
Registered—Prints.....	196
Total.....	43, 353
Sold—Copies of patents.....	2, 163, 057
Shipped to foreign countries—Copies of patents.....	991, 976
Copies of printed office records certified to.....	6, 616
Recorded—Assignments.....	29, 973
Number of words furnished by making photostat copies of office records.....	9, 196, 900
Number of typewritten words furnished as copies of office records.....	18, 253, 700

Number of applications filed for—

Inventions	62, 755
Designs	2, 787
Reissues	226
Trade-marks	8, 561
Labels	934
Prints	394
Total	75, 657
Number of applications allowed	51, 707
Number of amendments filed	143, 778
Number of appeals on merits	1, 914
Number of petitions to commissioner	3, 575
Number of notices of opposition	144
Number of interferences declared	1, 264
Number of interferences disposed of	1, 210
Number of letters constituting miscellaneous correspondence received, answered, and indexed	250, 262
Number of photostat copies of foreign patents furnished	107, 496
Number of photographic copies furnished	56, 307
Number of photostat copies furnished other departments without charge	5, 062
Number of photostat copies made for use in the Patent Office	22, 389

THE BUREAU OF EDUCATION.

1. Promoted the education of foreign-born residents through classes in schools and industrial plants, urged State legislative action for the education of immigrants, conducted conferences on Americanization, prepared articles on Americanization for papers having a circulation of 5,000,000 and assisted in organizing societies for the promotion of Americanization work.

2. Promoted the establishment of courses in community organization in colleges and universities, developed regular communication with 1,000 community organizations, and in cooperation with the Post Office Department arranged an experiment for cooperative buying and selling at schoolhouses as community centers.

3. Enrolled over 2,000,000 school children in 2,529 cities of the United States in school-directed home gardening. The total value of the product of the gardens approximated \$48,000,000.

4. Assisted the Committee on Education and Special Training in the formation of plans for training mechanics and technicians for the Army in civilian institutions and in establishing a Students' Army Training Corps.

5. Made a survey of 15 major cities and 250 smaller cities to ascertain their needs for commercial education with special reference to foreign-trade training.

6. In the School Board Service Division registered 20,000 high-grade teachers and made 15,000 nominations for positions.

7. Cooperated with the overseas educational commission of the Y. M. C. A. in preparing a course in citizenship for soldiers overseas.

8. Provided for State and local information on negro education, cooperated with the Y. M. C. A. in work among negro soldiers in France and advised with the Committee on Education and Special Training on the training of negro soldiers.

9. With the cooperation of the Child Health Organization published and distributed a series of health education bulletins and secured their widespread use in many cities and States.

10. In educational extension work distributed Federal documents, war courses, and package libraries.

11. Collected 6,000,000 feet of motion-picture film and deposited 4,000,000 feet of it with the extension divisions of universities.

12. With the cooperation of the governor of Alaska helped to check the spread of influenza and to relieve the suffering among the natives.

13. Made and completed, at the request of State and local school authorities, six educational surveys.

14. Secured data for a thorough and complete report of rural school consolidation in the country at large and in certain typical counties.

15. Held four important national and sectional conferences on rural education.

16. Held four conferences on plans for the improvement of schools in villages and small towns.

17. Undertook to work out with the cooperation with the Erlanger Mill Corporation a model system of schools for a cotton-mill village.

18. Held a conference of superintendents of city schools for the purpose of working out an adaptation of the school program to fit the industrial needs of older pupils during the war.

19. Held five conferences in Washington and three in other cities of the United States on various phases of industrial education and home making.

20. Conducted an intensive campaign for the establishment of kindergartens in Texas.

21. Distributed a leaflet on the use of the kindergarten in furthering the work of Americanization.

22. Collected statistics for the biennial survey of education throughout the United States for the biennial period 1916-1918.

23. Initiated and partly secured the adoption of a plan for securing from State departments of education educational statistics, collected by uniform methods throughout the United States.

24. Printed and circulated 1,505,448 copies of bulletins, reports, and other documents and 1,396,518 copies of circulars and duplicated letters.

25. Prepared and issued 93 educational bulletins and published the magazines "School Life," "Americanization," "National School Service," and "National Library Service."

26. Conducted an extensive correspondence on educational matters. In all 227,958 letters were received, an increase of 65,479 over 1918.

27. Prepared 100 new educational bibliographies and issued a series of six library leaflets.

28. Prepared and distributed information upon college opportunities for returning soldiers.

29. Prepared and distributed to State legislatures a manual of educational legislation.

30. Made a comprehensive study of free public libraries as they affect the rural population of the country.

31. Prepared and distributed a series of after-war reading courses for returned soldiers and for those in cantonments.

THE GEOLOGICAL SURVEY.

1. Continued its war work on the country's metallic mineral resources, making a census and special studies of deposits of iron, manganese, tungsten, zirconium, molybdenum, and quicksilver, extending further its search for new deposits, and preparing a wall map showing the deposits of manganese ore in the United States.

2. Contributed reports on mercury, graphite, phosphate rock, manganese, antimony, tungsten, magnesite, emery, corundum, bauxite and aluminum, and platinum to a series of mimeographed pamphlets issued by the Interior Department, showing the commercial control of these commodities throughout the world.

3. Collected weekly statistics of the production of copper, lead, zinc, and aluminum, and furnished them to the Government purchasing agencies, and cooperated with the War Industries Board and the Shipping Board in preparing tables and diagrams showing the supplies of minerals available and the estimated requirements.

4. Cooperated with the Fuel Administration in collecting statistics of production and movement of coal and coke, and mapped and filed data for the use of the Fuel Administration and other branches of the Government.

5. Carried along still further its studies to discover how far water power might be used to replace coal in view of the stress and the difficulties in mining and marketing coal, and cooperated with the Fuel Administration in working out a comprehensive scheme of classification of coals and a zoning system applicable to the country's coal fields and coal industry, to insure economy and efficiency in mining and transportation.

6. Continued its work in oil and gas fields and its search, both at home and abroad, for potash and nitrates, minerals urgently needed in the prosecution of the war.

7. Made examinations and estimates of resources of natural gas and a special cooperative research for helium-rich gas for use in inflating war balloons.

8. Made further studies of porous rocks, to discover more buoyant material for making concrete ships, and made search for material adapted to use as smudges.

9. Made examinations of deposits of high-grade clays in the eastern part of the United States to determine their availability for making paper or for making articles of porcelain or articles for use in electrical equipment.

10. Compiled information on road-building material for use in connection with a military map of the country.

11. Made about 1,500 laboratory analyses and assays, among them tests of rocks for platinum, a metal much needed for military use, and special determinations of the potash content of certain rocks.

12. Prepared military maps and descriptions of the country around several camps and training stations.

13. Prepared for the use of the Shipping Board 82 topographic maps and 69 accompanying tracings showing military information, and a large wall map of the world.

14. Prepared for the War Department and for boards and bureaus engaged in the conduct of the war information concerning water supplies from springs and wells in different parts of the country, as well as maps and descriptions of water supplies along the international border and the Atlantic coast.

15. Gave information and advice to the War and Navy Departments in regard to water supply at about 100 military and naval establishments in the United States, such as cantonments, forts, navy yards, aviation fields, powder factories, arsenals, and supply depots.

16. Made examinations of underground water for many camps, cantonments, and military and naval stations.

17. Prepared maps and data showing the location and extent of mineral deposits in foreign countries, their quality and their output by districts and regions, and the distribution of minerals in the world's commerce.

18. Prepared chapters on mineral commodities and on economic conditions in Japan and Sweden for incorporation in a report compiled by the Bureau of Research of the War Trade Board.

19. Prepared for the Capital Issues Committee geologic and statistical information to aid in directing capital into the fields where it would be of greatest use during the war.

20. Prepared, in cooperation with the Central Bureau of Planning and Statistics, a voluminous index of the information in the possession of several Government organizations concerning mineral resources.

21. Made a geologic reconnoissance of the islands of St. Thomas, St. John, and St. Croix of the Virgin Islands at the request of the Acting Secretary of the Navy and of the governor and naval commandant of the islands, with particular studies of the ground-water resources.

22. Investigated ground-water resources of eastern Porto Rico in compliance with a request from the Navy Department and examined manganese deposits of the island.

23. Continued surveys in Alaska, examining especially deposits of chromite and tin, making investigations in the region now being developed by the Government railroad, and continuing measurements of stream flow.

24. Made topographic surveys of areas in Alaska aggregating about 1,200 miles and geologic surveys of areas aggregating 3,500 square miles.

25. Maintained during the entire year a branch office in Alaska to provide closer cooperation between the Geological Survey and the operators of the Government coal mines, to keep in touch with local developments, and to furnish aid to prospectors and miners by giving them publications and information.

26. Collected annual statistics of the mineral production of Alaska.

27. Mapped more than 10,000 square miles of territory in the United States, laid more than 4,000 linear miles of primary traverse and more than 4,000 linear miles of levels, and established more than 2,000 permanent bench marks, occupying 61 triangulation stations and permanently marking 50 stations.

28. Instructed about 100 enlisted men in topographic map drafting.

29. Continued investigations of stream flow by maintaining more than 1,200 gauging stations in 38 States and in Hawaii and Alaska.

30. Continued statistical studies of power resources and output and investigated, in cooperation with the United States Fuel Administration, problems relating to the operation of power plants, the interconnection of transmission systems, and the substitution of water power for fuel power.

31. Prepared reports on desert watering places under a plan for mapping and marking the watering places in the arid region east of the Sierra Nevada and the Cascade Range and west of a line running from eastern Oregon through Salt Lake City and Santa Fe to the mouth of Pecos River.

32. Classified 6,439 acres of public lands as to their content of coal, 3,703 acres as coal land, and 2,736 acres as noncoal land.

33. Recommended withdrawal of 2,415 acres of coal land and restoration to entry of 3,331,552 acres, the classification and appraisal of which had been completed.

34. Recommended withdrawal from entry of 239,946 acres of probable oil land and the restoration to entry of 931 acres to entry as non-oil land.

35. Classified 129,421 acres of lands as to their content of oil shale, of which 125,341 acres were classified as lands valuable as a source of petroleum and nitrogen and 4,080 acres were classified as non-mineral lands.

36. Recommended withdrawals and restorations of oil-shale lands resulting in a reduction of the total oil-shale reserves to 128,267 acres, practically all of it reserved for the use of the Navy.

37. Reduced the reserves of potash-bearing land by 440 acres, leaving 130,029 acres now reserved.

38. Cooperated with the General Land Office and the Indian Office in supplying information concerning the mineral or nonmineral value and the value as to water resources of lands for which applications have been filed, acting on 4,259 such requests.

39. Furnished the General Land Office reports on the feasibility of irrigation projects and proposed power developments representing 240 cases.

40. Recommended the designation of 8,452,637 acres of land as non-irrigable under the enlarged-homestead act and the cancellation of the designation of 5,254 acres that had been previously classed as non-irrigable on information that the lands are irrigable.

41. Recommended the withdrawal of 7,392 acres for power sites and the restoration of 6,037 acres, leaving the total now so reserved 2,565,727 acres.

42. Investigated both surface and ground waters in connection with the classification of public lands with special reference to their use for power under permit or for agriculture under the enlarged-homestead, desert-land, or Carey acts.

43. Disposed of 29,176 applications made for entry to land under the stock-raising homestead law.

44. Recommended addition to the public water reserves of 22,422 acres and the elimination from water reserves of 1,375 acres.

45. Continued work in its lithographic plant for bureaus, boards, and offices of the War Department, the Navy Department, and other branches of the Government, printing maps, charts, diagrams, and other work in editions aggregating several hundred thousand.

46. Engraved and printed 140 regular topographic maps of areas in the United States, and printed editions of 360 maps, amounting to 945,000 copies.

47. Performed contract and miscellaneous work involving the printing of 2,935,543 copies, the total copies of all work printed amounting to 3,884,849.

48. Photolithographed and printed 30 new topographic war maps and compiled and printed 9 special maps of Army camps and cantonments, on the backs of which special descriptive texts were printed.

49. Published 147 reports containing 11,644 pages.

50. Supplied through Members of Congress from their legal quota 2,163 schools with sets of maps showing the various types of country in the United States for use in teaching geography and physiography.

51. Distributed 465,826 books, 8,865 folios, and 538,396 maps.

THE RECLAMATION SERVICE.

1. Continued the construction and operation of irrigation works capable of furnishing water to 1,602,000 acres of arid land and actually irrigated in 1918 nearly 1,120,000 acres, covered by project statistics, producing crops valued at over \$66,000,000.

2. Increased the area irrigated and covered by crop census 93,000 acres over that of the previous year.

3. Operated irrigation works including 40 reservoirs, several power and pumping plants, over 12,000 miles of canals and drains, as well as pipe lines, flumes, and tunnels and thousands of structures, such as dams, headgates, weirs, checks, drops, etc.

4. Continued the extension of the projects, including the construction of 396 miles of canals, 179 miles of drains, and nearly 8,000 canal structures, and excavated 14,000,000 cubic yards of earth and rock.

5. Continued the standardization of the numerous irrigation structures in the interest of economy and the efficient operation of the projects.

6. Continued the policy of stimulating crop production by expending construction funds where they would most quickly increase the productive area of the projects, by active cooperation with the farmers in leveling and otherwise preparing their lands for cultivation, by temporary leasing of withdrawn lands not yet ready for irrigation for dry farming and grazing purposes, by disposal of stored water to lands outside of the projects whenever it would result in increased production and would not jeopardize the project supply, and by encouraging better storage and marketing facilities.

7. Cooperated with other departments of the Government, with other bureaus of the Interior Department, with State governments, and with numerous local project organizations in the furtherance of reclamation work and the interests of the water users.

8. Carried on a survey of soldier-settlement possibilities throughout the United States resulting in the location of probably feasible projects in practically every State, ranging in area from 5,000 acres to over 200,000 acres.

THE BUREAU OF MINES.

Cooperated with various departments and bureaus of the Government in work relating to the war.

1. In cooperation with the War and Navy Departments continued work on a plant for recovering helium, a rare, noninflammable gas for balloons and airships from natural gas, and demonstrated the merits of the process used.

2. Completed the construction, in cooperation with the War Department, of a plant for manufacturing sodium cyanide by the Bucher process.

3. Investigated mining and milling problems at mineral deposits throughout the country in order to ascertain the available supply of war minerals, and how these minerals could be produced more efficiently.

4. Issued reports showing the markets for various ores, minerals, and metals, and giving data on the status of various mineral industries.

5. Made a thorough study of the manufacture of sulphuric acid in the United States.

6. As a result of an examination of methods of purifying crude graphite, developed improvements in milling practice.

7. Determined the possibility of substituting domestic for imported graphite in the manufacture of crucibles.

8. Made further advances in methods of utilizing radioactive substances.

9. During the year trained 9,781 miners in first aid and rescue methods at the mine safety cars and stations as compared with 8,851 in the fiscal year 1918.

10. Investigated causes of 29 mine accidents, 19 at coal mines and 10 at metal mines.

11. Determined the limitations of Army gas masks for use at mine and other fires and in industrial plants.

12. Sampled coal mines for the Navy Department and prepared reports on the quality of coal and the methods of mining and preparing it for market.

13. Continued work on the explosibility of coal dust from different mines, thereby gaining additional information on how coal-mine explosions can be prevented or limited.

14. Continued work on a method of signaling danger to miners underground by the injection of an ill-smelling substance into the compressed-air lines supplying machines and pumps.

15. Continued tests of explosives to determine their suitability for use in mines and quarries. Two new explosives were approved

as permissible for use in dusty or gaseous coal mines. At the end of the year there were 162 explosives on the permissible list.

16. Made further tests of an explosive made of liquid oxygen mixed with carbonaceous material, and studied its suitability for mining work.

17. Determined the value of the geophone, a device for detecting sounds transmitted through earth, coal, and rock, with reference to its use in locating mine fires and in communicating with miners entombed by a disaster.

18. Completed a comprehensive review of explosion tests of coal dust at the experimental mine near Bruceton, Pa.

19. Completed, in cooperation with the Bureau of Indian Affairs, the appraisal of the segregated coal and asphalt lands in eastern Oklahoma which belong to the Choctaw and Chickasaw Nations.

20. Investigated, in cooperation with the Public Health Service, dust and ventilation conditions in mines in Arizona.

21. In cooperation with State mine inspectors collected and published monthly reports on fatalities at coal mines throughout the country.

22. Improved furnaces in boilers for the Emergency Fleet Corporation, increasing the economy 16 per cent.

23. Acted in an advisory capacity for the United States Fuel Administration in matters of conservation.

24. Planned, and had charge of the construction and operation of the Government fuel yard in the District of Columbia, whence all Federal buildings in the District are supplied.

25. Prepared for the War Department special steels containing uranium, tungsten, molybdenum, and zirconium.

26. In administering the act regulating the manufacture, sale, possession, and use of explosives during the war, supervised the work of about 14,000 licensing agents throughout the United States and its insular possessions; investigated accidents at explosives plants; examined magazines for storing explosives; and began numerous prosecutions against violators of the provisions of the act.

27. Cooperated with the War Industries Board in measures to reserve an adequate supply of platinum for war requirements.

28. Began a comprehensive investigation of the white clays of the United States and the value of these clays in the ceramic industry.

29. Cooperated with the Geological Survey of Ohio in making a survey of the fire clays of that State.

30. In cooperation with the State of Idaho, investigated the treatment of complex lead-zinc and copper-iron sulphide ores by flotation.

31. Investigated the fuel value of the lignite in the Nenana field, Alaska.

32. Through field demonstrations showed operators and well drillers how large wastes of oil underground may be prevented by cementing oil wells so as to prevent water from entering the oil sands.

33. Gave the Bureau of Internal Revenue a method for estimating the future and ultimate production of oil fields, and thus determining depletion allowances in taxation of oil properties.

34. Cooperated with the officials of the State of Wyoming in formulating a proposed law governing the drilling of wells in that State.

35. Cooperated with State officials of Illinois in remedying troubles from underground water in oil fields.

36. Made a nation-wide investigation of the grades of motor gasoline being marketed.

37. Demonstrated the value of absorption for recovering gasoline vapors in the residual gas from compression plants for obtaining gasoline from natural gas.

38. Gave further attention to the recovery of oil from the oil shales of Utah and other States.

39. Continued investigations of the fusing temperature of the ash of different coals, in order to show the liability of the coals to clinker.

40. Began a comprehensive investigation of the best methods of utilizing lignite.

ALASKAN ENGINEERING COMMISSION.

During the fiscal year ending June 30, 1919, the following work on the Alaska Railroad was accomplished:

Considerable rehabilitation work on the old Alaska Northern Railway, from Seward (mile 0) to mile 70.

Thirty-eight miles of grading between mile 227 and mile 265 was practically completed; also the greater part of the grading for the 36 miles between mile 417 and mile 453 was completed.

Seventeen miles of rail were laid between mile 74 and mile 91; also 26 miles between mile 365 and mile 391; also 3 miles between mile 414 and mile 417; also 6 miles between mile 453 and mile 459—a total of 52 miles.

Location surveys were continued between mile 265 and mile 365 over the Broad Pass region.

The bridge over the Talkeetna River at mile 227 was completed.

Approach to dock in Anchorage Harbor was practically completed.

Necessary maintenance of sections of the line in operation was attended to.

Fifty-five thousand three hundred and ninety tons of coal were mined at the two Government mines in the Matanuska field.

During the year work was seriously hampered through lack of funds caused by the delay in the passage of the deficiency and sundry civil bills until July. Such a handicap is not expected to recur, as the bill authorizing the appropriation of \$17,000,000 (in addition to the \$35,000,000 originally appropriated) for the completion of the Government railroad was passed by Congress in October. Six million dollars of this amount has been appropriated for the fiscal year ending June 30, 1920, and it is expected that the balance of \$11,000,000 will be appropriated as needed.

Since June 30, 1919, and prior to the time that this report went to press, grading has been completed and track laid from mile 417 to mile 453, thus connecting Nenana and Fairbanks; also about 10 miles of rail has been laid north from Talkeetna at mile 227; also such progress in the construction of the dock at Anchorage has been made that the largest steamers now dock there.

The work which remains to be done includes the following:

Completion of the rehabilitation of the Alaska Northern Railway, including construction of snowsheds and enlarging of tunnels.

Construction of line from mile 237, ten (10) miles north of Talkeetna, to mile 365, five (5) miles north of Nenana Canyon. This is now the only gap in the line from Seward (mile 0) to Fairbanks, mile 471, with the exception of the bridge at Nenana, crossing the Tanana River, and a permanent bridge at mile 373 over the Nenana River. Completion of the dock at Anchorage. A map showing progress on the railway will be found in Appendix C, page 218.

Col. Frederick Mears, shortly after his return from France in July, was appointed chairman and chief engineer of the Alaskan Engineering Commission. Mr. Wm. C. Edes has been appointed consulting engineer.

THE NATIONAL PARK SERVICE.

1. Continued and expanded the work of informing the public about the national parks and monuments under the jurisdiction of this service.

2. Prepared 185,000 and distributed about 167,500 circulars of information relating to these recreational areas.

3. Prepared and distributed approximately 86,000 automobile maps of the national parks.

4. Continued the circulation of large quantities of motion-picture film and lantern slides of scenes in the national parks.

5. Handled the largest volume of tourist travel in the history of the parks; 1919 season, 755,527; 1918 season, 454,841; 1917 season, 490,705; 1916, 358,006; 1915, 335,299; 1914, 240,193.

6. Automobile travel to the national parks during 1919 season, 95,140; 1918, 54,596; 1917, 55,296; 1916, 29,828.

7. Grand Canyon National Park created February 26, 1919, thereby adding this titanic example of erosion to the national park system.

8. Lafayette National Park created February 26, 1919, giving States east of the Mississippi their first national park, and establishing first national park on the seashore.

9. Investigated and reported on merits of Mount Evans section in Colorado as national park material.

10. Completed the improvement of Sitka National Monument in Alaska, which included the repairing and painting of all the great totem poles on this reservation.

11. Secured the repeal of the inhibition against expenditure of more than \$10,000 per annum for Rocky Mountain Park, thereby paving way for greater development of that great scenic area.

12. Investigated status of lands in Hawaii National Park, and arranged for legislation which, when enacted, will assist in securing desirable private lands within park area by exchange of territorial lands.

13. Cooperated with highway and other associations in dissemination of information regarding parks and monuments.

14. Arranged for donation of block of land in city of Hot Springs, Ark., for location of free public bathhouse.

15. Installed a new water system in the Muir Woods National Monument.

16. Completed the road around the rim of the crater in Crater Lake National Park and trails from the road to Sun Notch and Crater Peak.

17. Established the feasibility of airplane travel to Yosemite and Rocky Mountain National Parks.

18. In cooperation with Smithsonian Institution conducted excavation and repair of ruins in Mesa Verde National Park.

19. Constructed new road in Mesa Verde National Park ascending the east side of Point Lookout, giving commanding view over surrounding territory.

20. Improved road through section of Petrified Forest National Monument, thereby opening up further area to visitors.

21. Made important repairs to Tumacacori Mission to preserve it from decay.

22. Made improvements in Casa Grande National Monument for better accommodation of visitors, and cooperated in archaeological investigations made there.

23. Completed trail to Forst's Cave in Shoshone Cavern National Monument, thereby opening up this natural curiosity to the public.

24. Cooperated with scientific societies in excavation work in Chaco Canyon and Gran Quivira National Monuments.

25. Engaged in cooperative work with the Bureau of Service, National Parks and Monuments, of the Railroad Administration, established in Chicago, to inform the public regarding railroad rates and tours to the national parks, monuments, and other resorts.

26. Established a course of lectures on the national parks and their attractions to be given each year in Yosemite National Park.

27. Furthered the establishment of museums in Yellowstone, Yosemite, and Rocky Mountain National Parks. Also at the Casa Grande Monument.

28. Completed new road in Gardiner River Canyon, Yellowstone National Park.

29. In cooperation with the Smithsonian Institution arranged for assembling of data for a book on the wild flowers and trees of Glacier Park, and with the Biological Survey and the University of Washington for a popular volume on the wild life of Mount Rainier National Park.

30. Cooperated with the National Parks Association, the Association of Mountaineering Clubs of America, and other organizations in the dissemination of information leading to a broader use and appreciation of the national parks.

31. Gave special attention to the conservation of the wild life of the parks and monuments, by reduction in number of predatory animals and establishment of game preserves.

32. Planted large consignments of fish in the lakes and streams of some of the larger parks, in cooperation with Federal and State commissions, in order to develop and maintain good fishing waters for tourists.

33. Conducted investigations of large tracts of land containing the redwood, with a view to the further conservation of this rapidly diminishing tree in national parks, and including the reservation of timber along public highways.

34. Collected \$196,703.03 in revenues from the national parks.

35. Prepared new edition of popular pamphlet *Glimpses of Our National Parks*, and copy for *Glimpses of Our National Monuments*.

36. Established new department of landscape engineering for the harmonious development of the national park areas.

37. Surveyed lines for new roads and trails in Grand Canyon, Glacier, and other national parks.

38. Planned for the extensive enlargement of facilities within the park to provide adequate accommodations of every kind for the traveling public.

39. Planned comprehensive trail development for Yosemite National Park.

40. Started detailed survey of floor of Yosemite Valley.

41. In addition to above attended to repair and maintenance work in all the parks under funds provided.

ABSTRACT OF REPORTS OF BUREAUS AND OTHER ADMINISTRATIVE UNITS OF THE DEPARTMENT.

OFFICE OF THE SOLICITOR.

The following table shows the number of matters received and disposed of during the fiscal year ended June 30, 1919, which were docketed or recorded. It does not, however, account for a very large number of miscellaneous matters of which no formal record was kept.

Work of office of solicitor.

	Public lands.		Pensions.		Miscellaneous. ¹	Disbarments.	Summary.
	Appeals.	On re-hearing.	Appeals.	On re-hearing.			
Pending July 1, 1918.....	479	89	281	8	101	6	964
Received June 30, 1919.....	1,360	294	501	26	8,262	20	10,463
Total.....	1,839	383	782	34	8,363	26	11,427
Disposed of.....	1,410	300	677	28	8,278	22	10,715
Pending July 1, 1919.....	429	83	105	6	85	4	712

¹ Under "Miscellaneous" are grouped such matters as opinions, Indian matters, contracts, leases, etc. as well as many other varied matters arising in the several bureaus of the department and which, for one reason or another, may be referred to the solicitor's office for consideration.

From the above table it will be noted that out of a total of 11,427 matters docketed, only 712 were pending and undetermined at the close of the fiscal year; and that the total of each class shows a reduction over that of the previous year. This volume of work represents formal appeals and a great variety of miscellaneous matters coming from every bureau of the department. An additional class of work now also being submitted for consideration by this office is that arising under the law providing for relief in certain cases of contracts connected with the prosecution of the war, commonly known as the "War minerals relief act." Notwithstanding the great volume and variety of work of the office, it is now reached in docket order for consideration within a little more than two months after receipt. By such early disposition, after careful examination of records and thorough consideration of the questions involved, a substantial benefit is conferred not only upon the parties in interest, but also upon a great many others transacting business before the department in various ways dependent upon such adjudication.

The court work during the year shows highly satisfactory results. Three cases against the Secretary were decided favorably by the

Supreme Court of the United States—in two, adverse judgments in the court of appeals having been reversed. The court of appeals decided seven cases in which the Secretary was involved. Of these, two (in one of which this office did not appear for the Secretary) were decided against the department. Eighteen cases were disposed of in the Supreme Court of the District of Columbia, in three instances adversely. In one of these the department took no appeal, leaving the decision final, and making the fourth case during the last 10 years where final judgment has been against the department. Another was a case not defended by this office. And the third, *State of New Mexico v. Lane* (being the one lost also in the court of appeals), is now pending in the Supreme Court of the United States, where it invites final judgment on the question, very important in the administration of public-land laws, as to when a State acquires a vested interest in land embraced in a selection list. Another interesting case decided *at nisi prius* involves the administrative ruling of February 15, 1917 (46 L. D., 32), construing the statutes governing soldiers' additional rights; with which construction the court agrees. Six cases have been argued and submitted, with no decision rendered at the close of the fiscal year. Eleven new suits were filed within the year. There are now pending: United States Supreme Court, 8; court of appeals, 4; Supreme Court of the District, 32; in all, 44. There are two other cases, decided in favor of the Secretary of the Interior by the court of appeals, potentially pending, where the right of appeal has not expired. Aside from these cases, this office represented the Government, unsuccessfully, in another case at the request of the solicitor general.

GENERAL LAND OFFICE.

Area of land entered and patented.—The total area of public and Indian lands originally entered and allowed during the fiscal year ended June 30, 1919, is 11,863,672.28 acres, not including 137,403.27 acres embraced in finals not heretofore counted as original dispositions of land. The latter area is constituted as follows: Public auction, 104,721.15 acres; abandoned military reservations, 7,509.29 acres; cash and private sales, individual claimants and small-holding claims, 14,090.26 acres; pre-emption entries, 86.26 acres; and soldiers' additional homesteads, 10,996.31 acres. The area of 11,863,672.28 acres is an increase of 1,889,340.67 acres, as compared with the area originally entered and allowed during the fiscal year 1918. This increase in allowed entries is due to the stock-raising homestead act of December 29, 1916, 5,559,235.11 acres having been allowed under that act.

The area patented during the fiscal year is 10,777,001.349 acres, an increase of 1,224,519.132 acres, as compared with the fiscal year 1918. Of the above area 8,312,318.888 acres were patented under the homestead laws, an increase of 1,819,521.072 acres, not including as homesteads 13,334.12 acres patented as soldiers' additional entries.

Cash receipts and expenditures.—The total cash receipts from the sales of public lands, including fees and commissions (\$1,194,472.10), sales of reclamation town sites (\$43,863.86), and sales of lands in the Oregon & California Railroad grant (\$114,008.32), for the fiscal year 1919 were \$2,817,063.27. The total receipts from the sales of Indian land were \$1,387,781.74. Other receipts aggregated \$98,829.19. The total receipts of this bureau during the fiscal year 1919 were \$4,303,674.20.

The total expenses of district land offices for salaries and commissions of registers and receivers and incidental expenses during the fiscal year ended June 30, 1919, were \$794,984.62. The aggregate expenditures and estimated liabilities of the public land service, including expenses of district land offices and surveys made from the appropriations for surveying the public lands outside of railroad land grant limits, were \$3,026,554.46, leaving a net surplus of \$1,277,119.74 of receipts over expenditures. Disbursements from the following special deposit trust funds and reimbursable appropriations are not included in the above figures as receipts or expenditures: From deposits by individuals for surveying the public lands, \$47,020.65; from surveying within land grants (reimbursable), \$12,572.36; from opening Indian reservations (reimbursable), \$2,672.93; and from surveying and allotting Indian reservations (reimbursable), \$54,705.49.

Field service.—As the result of investigations in the field, \$101,298.96 were collected and turned into the United States Treasury; in addition to this sum, \$10,944.41 have been placed in the Treasury as royalty on coal mined during the past year from a tract in Colorado, as well as \$26,193.35 as royalty from a coal lease in Wyoming.

As a result of field investigations 164,363.83 acres have been restored to the public domain; of this acreage 85,323.83 acres were restored to open range by abatement of unlawful inclosures without suit.

Special agents have investigated and reported on 17,399 cases, 3,447 of which were adversely and 13,952 favorably reported. Two hundred and fifty-two hearings in Government contest cases have been held. Civil suits in 65 cases were recommended to the Department of Justice as the result of investigations during the year. Eighty-six were tried in court, of which 60 were won and 26 lost. As the result of the successful suits, \$43,895.94 was recovered and

8,091.26 acres were restored to the public domain, of which 6,180 acres had been unlawfully inclosed.

Of the criminal cases tried during the year, 14 resulted in convictions, under which there were six prison sentences imposed and fines amounting to \$1,000 paid.

The prevalence of forest fires on public lands is noted, and the expenditure of money from our appropriation for protecting the public lands as a consequence, and the urgent necessity of a special appropriation for protecting such timber from forest fires, as well as for the reimbursement of the fund for protecting public lands to the extent that it may have been depleted by this cause.

Oil land claims.—California: Referring to the Commissioner's annual report for 1917 for a full statement as to the situation in the oil fields in California and Wyoming in the matter of claims pending in the Land Department and before the courts, and the main questions involved therein, additional data is furnished in tabulated form necessary to bring the oil story up to date, as well as a summary of the present status of proceedings in the courts and in the department.

Wyoming: Additional withdrawals aggregating 98,018 acres were made during the fiscal year and 931 acres were restored as nonoil. On June 30, 1919, 1,180,987 acres were embraced within existing withdrawals. During the year 19 applications for patent, embracing 3,040 acres of land in the withdrawn area, were rejected, and patent was issued on one application embracing 32.22 acres. Patent also issued on two other applications outside of withdrawn area aggregating 100.16 acres. Ten new applications embracing 1,440 acres were filed, and at the end of the fiscal year 58 applications for patent embracing approximately 8,880 acres were pending.

Oil contracts.—At the end of the year there were 40 contracts under the act of August 25, 1914 (38 Stat., 708), in operation in California, embracing 4,165 acres. The production from the tracts covered by these contracts up to June 30 was 8,270,657.92 barrels of crude oil, 709,725,978 metered feet of dry gas, and 698,816 gallons of gasoline, the escrow deposits thereunder amounting to \$1,152,523.48.

In Wyoming nine contracts, covering approximately 800 acres of land in the Salt Creek field, are in force, 27 contracts during the year having been discontinued on the increase of the escrow deposit called for. The total production in Wyoming under these contracts during the year was 9,545,131.20 barrels of crude oil; 286,836,682 metered feet of gas, the escrow deposits amounting to \$3,172,482.36.

The total production in both California and Wyoming under these agreements has resulted in escrow deposits of \$4,325,005.84.

Operations on two 40-acre tracts in the Grass Creek Field held under State leases not covered by agreements under the act of Au-

gust 25, 1914, have resulted in an escrow deposit under special agreement of \$2,119,306.58.

Under arrangement with the operators in California and Wyoming, including those operating in Grass Creek, under lease from the State, \$1,192,400 of the escrow deposits were invested in Fourth Liberty loan bonds and \$1,436,750 in Victory loan notes, which, with the \$2,114.850 theretofore invested in Liberty bonds of the first three issues, makes a total of \$4,744,000 so invested.

"Ferry" or "Caddo Lake" oil lands in Louisiana.—The pendency of litigation on behalf of the United States in the United States District Court, western district of Louisiana, of 18 suits involving the "Ferry" or "Caddo Lake" oil lands was mentioned in his prior report with a brief statement of the facts leading thereto. These suits came up for trial during the spring and summer of 1918. The total amount which the Government sought to recover in the 18 suits was \$614,942.27 and nearly 100 parties, including a number of leading oil companies, were made defendants. On January 11, 1919, the master in chancery filed his report in 17 of the suits recommending decrees in favor of the Government, quieting title to the lands and awarding damages in excess of \$400,000. In the other suit an award favorable to the Government was made with damages to the amount of \$62,581.85. The findings of the master were sustained in a decision handed down by the court July 15, 1919. By this decree the Government has its title to approximately 617 acres of oil lands quieted and obtains possession of 23 producing oil wells, and is awarded the sum of \$462,903.39.

An additional suit has been instituted on the recommendation of the Land Department against certain companies to quiet title to alleged unappropriated, unreserved public lands and to recover the sum of \$317,919.38, the value of oil extracted therefrom.

Arkansas "sunk and lake lands."—Since the issuance of the last annual report the work relative to these lands has been largely in the nature of a cleaning-up process. After the decision of the United States Supreme Court, November 5, 1917, in the case of Lee Wilson & Co. against the United States, the Government was enabled to proceed rapidly with the prosecution of its recovery of these lands, and the past year has witnessed the accomplishment of a large amount of work in that direction. A favorable decree was obtained by the Government on June 25, 1919, in the United States District Court, Eastern District of Arkansas, in the case of United States against Chapman & Dewey Land Co. et al., by which the title was quieted in the United States to an area of approximately 54,000 acres, largely agricultural and timbered lands said to be worth about \$50 per acre, or \$2,700,000.

On June 21, 1919, the Government also obtained a decree in the same court in the case of the United States against John W. Walker et al., involving approximately 700 acres of land. This case is important on account of its value as a precedent. The commissioner makes a full statement of the work accomplished in this field and adds that besides the recovery of the lands noted the Government has also collected and covered into the United States Treasury \$48,719.97 for timber cut in trespass and removed from the lands.

The lands involved in these proceedings were erroneously omitted from the original surveys and have now been restored to the public domain, and most of them are at present included in homestead entries. To date 165 patents have been issued placing the title to about 19,000 acres in private ownership.

Surveys.—The accepted surveys and resurveys for the fiscal year ended is 7,668,514 acres.

The act of September 21, 1918 (40 Stat., 965), provides for an enlargement of the resurvey work, the Government being thereby authorized to resurvey townships heretofore held to be ineligible for resurvey on account of the excess private ownership therein. Suitable regulations for procedure under the terms of this act have been promulgated.

The work of the eastern surveying district includes the miscellaneous fragmentary public lands surveys and examinations and Indian surveys in those States where the former United States surveyor general's offices have been discontinued and the work in this field has been unusually active and productive of results during the year that is past.

Special attention is also called to the surveys in Alaska, with a sketch of their progress from point to point, in order to anticipate the needs of settlers and the development of the territory, particularly in view of the country already opened up by the construction of the Government railroad and the future progress of this enterprise.

The showing made in the offices of surveyors general is especially commended by the commissioner on account of the large reduction of arrearages accomplished in several of the States. Attention is called to the controversies that have arisen over lands lying along Red River where it constitutes the boundary between Oklahoma and Texas. The discovery of oil in this neighborhood has given a sudden value to these lands and the boundary questions will probably be settled in the courts, as the United States has already instituted proceedings for the protection of the rights of certain Indian allottees as riparian owners to adjacent lands.

Drafting and map making.—The edition of the 1919 United States map was only 8,519 copies, while that of the 1918 edition was 15,000 copies, the difference being due to the increased cost, owing to ad-

vancing outlay for labor, muslin, paper, and other materials. The cost of the 1918 edition was \$1.04 and that of the 1919 edition was \$1.90 per map. A larger appropriation for the production of the United States map is necessary to provide the number called for by Congress and for the commissioner's use.

Tract-book notations.—The total number of notations for the year was 376,151. This includes 719 Indian allotments, 12,188 petitions to designate under the acts of February 19, 1909, and December 29, 1916; and 48,079 patents. The number of plats posted was 1,037.

Homesteads, desert entries, timber and stone applications, and kindred applications, were given a preliminary examination, embracing in total 32,193, of which number 24,498 were accepted, and 7,695 held for further action on account of conflicts and for defects of various kinds.

Supplemental patents under the act of April 14, 1914, authorizing such issue on reclassification of lands showing their noncoal character were issued in 1,898 cases.

Homestead and kindred entries.—There were approved for patenting 33,247 homestead entries on which final three or five year certificates had issued, 2,300 commuted homestead entries, 1,883 final homestead entries within national forests, 453 timber and stone entries, and 2,248 miscellaneous cash entries, a total for the year of 40,131 as against 32,120 of the previous year. Applications to make second homestead entries were allowed aggregating 2,792, while 1,097 were denied; 1,224 applications to amend were allowed and 270 denied; 2,108 applications for the sale of isolated tracts were approved, 713 denied.

Stock-raising homesteads.—The commissioner reports satisfactory progress in the matter of designating lands subject to this form of entry, and the allowance of entries therefor. The area of stock-raising lands designated to date is 20,181,868 acres. During the year 14,248 petitions were received asking for the designation of land under the act, and 22,000 petitions of such character received favorable consideration; the whole number of petitions filed asking for such designation since the passage of the act is 48,897. During the year now past the total number of entries allowed under this act were 15,037, covering an area of 5,559,235 acres.

Stock driveways.—The commissioner states that since his last annual report field investigation under the applications of stock men and recommendations of the Forest Service for stock driveways in Nevada and New Mexico has been completed. This work is also completed in South Dakota, Colorado, Montana, Oregon, Washington, and Wyoming, with the exception of certain investigations of incomplete applications or of areas heretofore temporarily withdrawn for such purpose pending further investigation. A few appli-

cations remain to be investigated in Arizona, California, and Idaho; field investigations are progressing satisfactorily upon the remaining applications in Utah. The total area withdrawn for stock driveway purposes at the close of the fiscal year is 6,623,531 acres.

Soldiers' additional homestead rights.—Attention is called to the administrative ruling of June 13, 1919, by the Secretary of the Interior, in which it was directed that the rule of approximation will no longer be permitted in the location of soldiers' additional homestead rights, whether in their entirety, partly, or in combination with their rights or parts thereof. This rule becomes effective December 1, 1919. It was made necessary by the character of the applications of late years, largely made up of small fractions combined under the rule of approximation so as to obtain title to 40-acre tracts by the location of a little more than 20 acres of soldiers' rights and paying the Government price for the excess.

More than 60 per cent of the new applications have been made for lands in the grazing region of California, Nevada, and Wyoming, apparently to obtain control of springs and water holes used by the general public for watering stock on the public range. These applications are all investigated carefully and the lands embraced therein withdrawn for public water reserves if the public need demands such action.

Town-site, town-lot, and kindred entries.—Nineteen town-site and kindred entries were received during the year, amounting, with the four pending at the beginning of the year, to 23, of which number 20 have been approved for patenting, leaving 3 pending.

At the beginning of the fiscal year 112 lot entries were pending, and there were received during the year 1,208, making a total of 1,320 lot entries, of which number 1,251 were approved for patenting, leaving 69 pending at the end of the year. These entries include 1,288 lots.

During the fiscal year there has been received for the sale of town lots outside of Alaska \$112,871.30.

The receipts from sales of lots in town sites in Alaska under the railway construction act of March 12, 1914, amount to the sum of \$28,099.65. Other sales in Alaska under the act of March 3, 1891, have been made in the town sites of Wrangell, Haines, and Douglas. The proceeds from Douglas amount to \$1,257.06, and from Haines \$2,118.20. The trust for the town site of Wrangell has not been completed.

Rights of way.—During the year there were received 430 applications for rights of way of all kinds, of which 81 were for railroad rights of way and 349 for "all others," excepting hydroelectric power projects.

During the year 185 cases have been docketed looking toward the forfeiture of rights of way where there has been no construction

within the statutory period. One hundred and five cases of this kind were finally disposed of in the past year, of which number nine were declared forfeited by decree of court after judicial proceedings, and the balance by relinquishment or otherwise.

State irrigation districts.—In accordance with the act of August 11, 1916, and the regulations thereunder, there have been filed five applications, three in California, one in Oregon, and one in Idaho, involving 131,148 acres of public land, which it is sought to bring under the taxing power of the State, through the approval of the applications by the Secretary of the Interior.

Private irrigation projects.—Sixty-one new reports and 28 supplemental reports have been received as a result of investigations of private irrigation enterprises, and irrigation districts, upon which claimants and applicants under the desert-land laws are dependent for their water supplies, making a total of 978 projects investigated since the adoption of this form of procedure to determine the feasibility of alleged projects.

Hydroelectric power.—During the past fiscal year two permits were granted under the provisions of the act of February 15, 1901, and during the year seven rights of way under the act of March 4, 1911, were also granted.

For the use of public lands under permits and grants for hydroelectric power development, power-transmission lines, etc., the sum of \$8,137.07 was collected.

Carey Act.—Of the 264,533 acres for which applications for patent were either pending or received during the year, 85,699 acres have been patented and 5,460 acres disallowed, leaving 173,365 acres pending at the present time.

Withdrawals and segregations made during the year total 3,532 acres, and restorations during the same period, 565,899 acres.

Desert land.—During the fiscal year 1,675 final desert-land entries were patented, involving 267,065.22 acres.

Reclamation homesteads.—Six hundred and fifty-three final homestead entries under the reclamation act of June 17, 1902, were approved for patenting.

No large opening of farm units occurred during the past year. About 23,000 acres formerly embraced in the Sun River project, Montana, were restored to homestead entry.

Withdrawals were made during the year for the Sentinel project, Arizona; Bruneau and Mountain Home projects, Idaho; Oregon Basin project and Riverton project, Wyoming. The total area of lands withdrawn during the year was 3,868,840 acres, while the area restored was 120,240 acres.

Stock-watering reservoirs.—Applications for 20 stock-watering reservoirs were approved during the year; 205 are yet pending, of which number 133 are awaiting response to calls and 72 office action.

Withdrawals and restorations.—During the past year 9,793,525 acres of public lands were withdrawn or placed in the state of reservation under the various acts applicable thereto, and 4,978,403 theretofore withdrawn have been restored. Some of the withdrawals overlap in part former withdrawals for other purposes, and some are in the form of blanket withdrawals, without strict regard to lands entered or applied for, so that the total of withdrawn lands does not represent accurately the amount of public enterable lands withdrawn. The same may be said of restorations. Under this head the commissioner's report furnishes a tabulated statement.

State selections and State grants.—Indemnity school-land selections aggregating 472,090.33 acres, and selections under grants in quantity embracing 87,080.04 acres, were received during the year. There were certified to the States during the same time 1,277,909.11 acres of indemnity school land and 350,925.46 acres of quantity grant land. Under the several acts of Congress authorizing certification to the States with reservations of mineral deposits to the United States 53,025.12 acres have been thus certified. The commissioner calls attention to the cooperative agreements entered into between the United States and some of the States under which school lands within the boundaries of national forests are exchanged for other lands within forest boundaries, the lands so selected by the States upon confirmation of title being eliminated from the forest; the total so far confirmed to the States under these agreements amounts to 203,750.80 acres.

School grant to the State of Washington.—The controversy between the State of Washington and the Land Department as to the applicability of the act of February 28, 1891, to the school grant made to the State of Washington has been made the subject of an agreement by which the representatives of the State undertake to institute or cause to be instituted and prosecuted to the supreme court of the State and, if deemed advisable, to the Supreme Court of the United States without delay, such legal actions as may be appropriate to obtain decisions on the disputed question. Pending this determination action on some 85,000 acres of selections is withheld.

Railroad grants.—Railroad and wagon-road selections were received during the year to the amount of 529,900.03 acres as against 665,372.49 acres in 1918.

There were patented 632,284.40 acres as against 943,399.78 acres in 1918.

The suit referred to in the commissioner's report of 1918 as having been instituted against the Southern Oregon Co., successor in interest to the Coos Bay Wagon Road grant was settled under authority of the act of February 26, 1919 (40 Stat., 1197), the company executing its deed of reconveyance for some 93,000 acres of land for which the

United States paid \$2.50 per acre and became responsible to the State for the taxes due and unpaid on said lands estimated at over \$547,000. These lands will be disposed of in accordance with the act of June 9, 1916 (39 Stat., 218), providing for the classification and disposition of the lands formerly included in the Oregon & California Railroad grant.

The adjustment of the grant to The Dalles military road under the decision of the department dated January 24, 1917 (45 L. D., 613), wherein it was held that the actual location of the road as constructed defined the limits of the grant and not the diagram theretofore used in adjusting claims thereunder is well under way and the resulting deficiency of 36,066.55 acres is being made good from the limits as thus ascertained.

Practically all of the Oregon & California grant lands revested in the United States by the act of June 9, 1916 (39 Stat., 218), have been classified, except the unpatented lands in the primary limits within forest reserves, approximately 400,000 acres, although this area will be reduced to the extent that the lands are found to be mineral in character. About 472,000 acres, of which 318,000 acres are unsurveyed in the indemnity limit within national forests, are also unclassified. Under present rulings the right of selection by the company of these lands is defeated. Under the adjustment required by the act of revestment it became necessary to survey approximately 182,000 acres of land in the primary limits and in the indemnity limits outside the forest reserves. This survey is now nearly completed.

Timber on isolated tracts of the Oregon & California revested lands, aggregating 2,875.76 acres, has been sold this year, amounting to 65,414,000 feet board measure, for which there was received the sum of \$96,497.83. The act of May 31, 1918 (40 Stat., 593), authorizes the Secretary of the Interior in handling the revested Oregon & California lands to exchange such lands for other lands of approximately equal aggregate value held in private ownership either within or contiguous to the former limits of the railroad grant, when by such action he will be enabled advantageously to consolidate the holding of the timberlands by the United States. A number of applications proposing exchanges under this act, involving approximately 80,000 acres of land, have been received and are now under process of consideration in the office and the field.

Swamp and overflowed lands.—The total area conveyed to the several States the beneficiaries under this grant up to July 1, 1919, is 63,906,694.83 acres.

The commissioner renews his recommendation that legislation be enacted declaring that after a fixed date, preferably six months after

the passage of the act, no new claim to swamp and overflowed lands made by any State shall be received.

Claims in Texas.—During the last year several applications have been made to the commissioner calling for the exercise of jurisdiction of the Land Department over lands within the State of Texas, each of which was denied, and on appeal it was held in the department, June 12, 1919, that the United States had no jurisdiction over public lands or private land claims in Texas and dismissed such applications.

Abandoned military reservations.—The commissioner reports a number of probable sales for the ensuing year with items of interest in connection therewith, especially in the case of Fort Sabine, in Cameron Parish, La., where the lands have a special value on account of their proximity to the Beaumont oil fields.

Indian allotments.—Trust patents have been issued during the year on 2,433 allotments, covering a total area of 395,539.95 acres. With the exception of large reservations in New Mexico and Arizona and the mission reservations in California, the great bulk of lands held in common by the several tribes has now been divided among the individual Indians entitled thereto.

Chippewa logging operations.—During the last year 1,524,120 feet of timber were cut under the provisions of the act of June 27, 1902 (32 Stat., 400), for which the purchasers paid \$9,030.62. The total amount cut up to July 1, 1919, under this act is 1,283,025,956 feet, for which the purchasers have paid \$9,084,839.44.

Minnesota drainage.—During the year there have been approved for patenting 1,118 entries subject to drainage taxes under the Volstead Act of May 20, 1908 (35 Stat., 169), covering approximately an area of 176,320 acres, as against 146,240 acres the previous year. A total area of 766,920 acres have been patented under this act.

Sale of Indian lands.—Within the former Flathead Indian Reservation 4,356.24 acres near Kalispell, Mont., were offered for sale June 20, 1919, and 9,586.05 acres within said reservation, situated in the Missoula land district, were offered for sale June 26, 1919. The lands were listed in tracts embracing from 40 to 160 acres each. Fourteen of the 48 such tracts of the Kalispell lands sold for \$2,466.85, and 16 of the 129 such tracts of the Missoula lands sold for \$2,029.73.

Twenty-six tracts of land within the former Sioux Indian Reservation, S. Dak., embracing from 40 to 160 acres each, were offered for sale at Pierre, S. Dak., and sold under the act of March 4, 1915 (38 Stat., 1189), for the sum of \$4,818.08.

Mining claims.—The total area embraced in approved mineral entries for the year was 32,559.774 acres, for which the sum of

\$137,381.09 was received; in approved coal entries 7,843.17 acres, for which \$295,031.75 was received.

An Alaska coal-land lease of blocks 49 and 50, Bering River field, comprising 2,080 acres, was issued during the year, making a total of 4,500 acres under lease in that field. In the Matanuska field no new areas have been leased. There are now in this field 2,840 acres under lease. No leases have been made in the Nenana field.

During the year leases of potash lands in Searles Lake, Calif., were completed, covering a total of 12,760 acres in 9 leases; another lease for 980 acres of the lake bed has been authorized. Applications for permits to prospect for potash were received to the number of 208 during the year, making a total of 494 applications received altogether. Ninety-three permits to prospect were issued, making a total of 102 permits issued, of which number two have been canceled.

National forests.—There are now 151 national forests, embracing 174,261,393 acres, of which a little over 88 per cent is public land. The net decrease in national forest area since the beginning of the fiscal year is 1,689,873 acres. During the year 1,658,988 acres have been excluded from national forests, 609,925 acres thereof reserved or withdrawn for certain public purposes, and the public lands in the remaining 1,049,063 acres and in 166,875 acres released from temporary or other withdrawals for forest purposes, have been restored to entry and other disposition.

Forest lieu selections.—The decision of April 1, 1918 (46 L. D., 341), in the case of F. A. Hyde & Co., held as to lands in California that if a patent issued to a real person the fact that such patent was fraudulently procured was immaterial if the State had taken no steps to rescind such patents when it was in a position so to do, and was thereafter barred by the statute of limitations. As a result of this decision this class of cases has been practically closed out, and there now remains of the California cases but those wherein it was charged by the Government that the patentees of the State were fictitious persons, and a consolidated hearing as to these cases has been held at San Francisco resulting in 53 cases being returned to the department under remanding orders, 16 being rejected in this office subject to appeal and 31 now awaiting action.

Selections based on lands the title to which was secured from the State of Oregon have been suspended to await the result of suits instituted by the State to cancel patents issued by it on fraudulent representations. The State has been successful in many of these suits and copies of decrees canceling State patents have recently been received, upon which action will be taken as soon as practicable.

Nineteen forest lieu selections have been patented and 50 canceled during the year.

Lieu selections for lands in Indian reservations.—The act of April 21, 1904 (35 Stat., 211), authorizes selections of public lands in New Mexico and Arizona in lieu of lands in Indian reservations. On June 6, 1916, the department decided not to allow any further exchange under this act unless in exceptional cases. Two such cases have recently arisen, the first of 47,056.75 acres in the Laguna Pueblo Reserve, owned by the Santa Fe Pacific Railroad and the New Mexico & Oregon Land Co., and the second of 37,243.63 acres of Zuni lands, of the Santa Fe Pacific Railroad Co.

Contests.—During the year litigation in the land office aside from questions incident to the adjustment of grants and the prosecution of claims for title is well in hand. Ten thousand and seventeen such cases were the subject of final decision as well as 1,654 cases that were dismissed for failure of prosecution on the part of the contestant or in default of answer by the defendant.

Repayments.—Under the several statutes authorizing repayments there were stated during the last fiscal year 762 accounts, allowing repayment of \$80,896.70, and during said period there were denied 285 claims for repayment. Of this number of claims allowed and the amount repaid 91 are accounts allowing the repayment of \$17,601 received in connection with the sale of various Indian reservation lands and repaid from Indian trust funds.

INDIAN AFFAIRS.

Releasing Indians from Government supervision.—The effect of the new policy issued April 17, 1917, is clearly shown by the fact that under the acts of Congress approved May 8, 1916, and June 25, 1910, 9,894 fee patents were issued to Indians in the 10 years from 1906 to 1916, while during the last 3 years 10,956 fee patents have been issued, amounting to an increase on the average annual issuance of 2,663 fee patents under the operation of the new policy.

Within the year, 4,376 fee patents were approved, involving an area of 778,698 acres.

On March 7, 1919, an order was issued calling for lists of all Indians of one-half or less Indian blood, who are able-bodied, mentally competent, and 21 years of age. Under this broadening of the policy it is estimated that 4,500 additional fee patents will be issued.

Attention is being given to the clearing up of inherited estates, of which there are approximately 20,000, and detailed instructions have been issued to the Field Service for settling these estates by partition or sale of the land and issuing fee patents to the heirs wherever practicable under the policy of April, 1917, which will further increase the number who will be no longer wards of the Government.

Citizenship.—The question of Indian citizenship has become of foremost interest, and has been the subject of several bills recently introduced in Congress.

As far back as 1817, provision was made in a treaty with the Cherokees by which any member of that tribe who desired might become a citizen of the United States. Subsequent treaties and acts of Congress contained provisions by which members of other tribes might become citizens.

The question whether under the Fourteenth amendment to the Constitution an Indian could, by severing his tribal relations, and completely surrendering himself to the jurisdiction of the United States, become a citizen thereof was determined in the negative by the Supreme Court in *Elk v. Wilkins* (112 U. S., p. 100).

No general law provided a means for citizenship of all Indians until 1887 when Congress passed the general allotment act (24 Stats. L., 388), which provided for the allotment of lands in severalty and declared all Indians born within its limits, who shall have complied with certain conditions, to be citizens of the United States. The broad citizenship provisions of this act were modified by Congress when on May 8, 1906, it passed the Burke Act, since which law the issuance of a fee patent has been the primary legal requirement for citizenship of Indians. It is believed that the controlling factor in granting citizenship to Indians should not be based upon their ownership of lands, tribal or in severalty, in trust or in fee, but upon the fact that they are real Americans and are of right entitled to such citizenship.

War as a civilizer.—Few things more helpful have come to the Indian race than the enrollment of 10,000 of its sons as American soldiers to challenge the barbarous rule of central Europe. Mingled indiscriminately with white troops, the Indians of necessity learned their language besides having equal opportunity with them for observation, for maturing judgment, and developing courage through contact with events and conditions that trained and toughened character in defense of a just cause and a great ideal. Many reports from superintendencies are in line with the following:

A number of full-blood Cherokees lately returned, none of whom could speak a word of English on entering the service, now talk English fluently.

I do not know of a single case where the returned Indian has not benefited, mentally and physically, to a degree plainly noticeable and commented upon by the whites of his community.

Five of these soldier boys returned recently from their work in France with a broader outlook on life and a desire to do something creditable to themselves and their people.

Those who have returned to the reservation show amazing progress in many ways—self-reliance, industry, personal habits, and proper respect for authority.

The refusal of your office to permit the segregation of Indian troops was of the greatest benefit, resulting in most cases in but one Indian to a company of

white soldiers and thus compelling them in every way to take up the life and manners of the white man. I safely say that our returned soldiers now constitute the best type of young Indian manhood.

He has greater self-confidence. He realizes that there is a place for him in the community; that he is a unit in the great Commonwealth.

The distinguished-service record of the Indian was probably not below that of any other people engaged in the war. He bears his honors modestly, which prevents definite information regarding many cases of individual valor. From instances cited in a partial list it is doubtful if a more brilliant one stands to the credit of any soldier than the achievement of Pvt. Joseph Oklahombi, a full-blood Choctaw, of Oklahoma, who received the *croix de guerre* under an order of Marshal Petain, a translation of which follows:

Under a violent barrage, dashed to the attack of enemy position, covering about 210 yards through barbed-wire entanglements. He rushed on machine-gun nests, capturing 171 prisoners. He stormed a strongly held position containing more than 50 machine guns and a number of trench mortars. Turned the captured guns on the enemy and held the position for four days in spite of a constant barrage of large projectiles and of gas shells. Crossed "no man's land" many times to get information concerning the enemy and to assist his wounded comrades.

Education.—The Indian schools accomplished their full work under the course of study with but slight exception, although vacancies occurred in many important positions owing to war-time conditions. Such deficiencies as prevailed were due more to the per capita allowance of funds, which was not proportionate to the advanced cost of supplies, than to other causes.

In order further to increase the attendance of Indian children in the public schools, where such schools are available, and to require well-to-do and citizen Indians to defray the cost of their children's education, the school rules were amended with a view to eliminating certain classes and thus affording better provisions for those in greater need of Government aid. Under the amended rules—

There shall not be enrolled in Government nonreservation schools any Indian children who are not under Federal supervision without prior authority from the Commissioner of Indian Affairs.

There shall not be enrolled in any Indian reservation boarding or day schools any Indian children not under Federal supervision, except such as are entitled to share in the benefits of treaty or trust funds from which the school is maintained, without prior authority from the Commissioner of Indian Affairs.

Except as to reservation schools supported from tribal funds or under specific treaty stipulations, Indian pupils who have ample financial resources or whose parents have such resources sufficient for payment of all or part of the expenses of the pupil's education, whether or not the parents are wards of the Government, shall be required to pay their transportation, and all or part of the actual cost of their support and education, not to exceed \$200 a year, or at the rate of \$20 a month for a fraction of a year. Superintendents will enforce this regulation.

The purpose is to push actively the policy of reserving the Indian schools for children who are not provided with adequate free schools facilities and to pay tuition for those who have access to public schools but whose parents are wards of the Government.

Under this policy it was practicable within the year to discontinue 10 boarding schools and a number of day schools, which will result in better schooling for the more needy, ample care for those who attended the abolished schools, and a more economical administration.

Owing to abnormal costs of labor and material, construction of new school plants was impeded during the year and projects of this nature were conducted in open market at a saving over contract work of approximately 40 per cent.

Indian fairs and Indian exhibits at county and State fairs are adjunctively growing features of education. Fostered by certificates of merit and prizes, much is thus learned industrially, and the "better baby show," now a prominent feature, is a distinct impetus to better health.

Employment of young men and women in various lines of commercial, agricultural, and mechanical work was greatly extended, and now supplements the schools with practical training of importance that foretells economic stability and progress among the Indians.

Health.—Except for the epidemic of influenza and the sorrows of that severe visitation the health record of the Indians for the past year could be written as normal, notwithstanding the impairment of the service by the heavy loss of both physicians and nurses in response to war demands. But the great pandemic was on the whole efficiently resisted by great personal effort and sacrifice on the part of the field personnel generally. Many localities were handled with splendid results, and in one of the largest schools not a single case developed among 600 pupils and employees.

The health problems among the Indians are essentially the same as in rural communities and school assemblies. The service emphasizes those things which prevent disease and aims to secure better housing, better water supplies, better bodily nutrition, the practice of hygiene, sanitation, and well-ordered living. Constant effort is made to promote Indian industry in general and particularly farming. Agriculture and thrift are regarded as the pillars of a health arch of which sanitary education is the keystone. Work and prosperity lead to health and happiness.

With the resumption of normal conditions, definite health plans will be carried forward under thorough organization in districts requiring special attention.

Suppression of the liquor traffic.—The liquor forces continue to violate the law wherever it seems possible to acquire huge profits. The year has been an active one, notwithstanding the war restrictions

against the manufacture and sale of liquor. There were 1,516 new cases instituted during the year, 2,135 cases disposed of, 33,924 gallons of various kinds of intoxicants seized and destroyed, and 112 automobiles engaged in the illegal traffic libeled and sold for \$42,869. The year's operations covered 27 different States, and include prosecutions for violations of State, Federal, and municipal laws.

An investigation of complaints that Indian Service officers were destroying unfermented grape juice in large quantities in Minnesota disclosed that many carloads of California grapes were being shipped into the territory covered by the Indian treaty containing prohibition against intoxicating liquors, but that they were not being used for making the ordinary form of "grape juice." Thousands of gallons were destroyed, but no action was taken against any person using grapes for ordinary unfermented grape juice.

The value of prohibition to the La Pointe Indians appears in information indicating that from the date it was effective, July 1, 1918, the total arrests for the next 6 months in the city of Ashland, Wis., were 236, as against 1,366 for the last six months of the wet period.

Farming and stock raising.—Upon the assumption that postwar conditions would require increased production to satisfy foreign and domestic demands, with as little soaring of prices as possible, the Indian field service was urged early to renew and stimulate for greater results the previous year's campaign. Emphasis was given to early preparation for the seedtime; the necessity for garden culture, the raising, drying, and canning of vegetables and fruits for home consumption as a measure of releasing other products for market, and especially to the extension of cultivated lands by the Indians. Responsive reports were encouraging from nearly every quarter, indicating that the high standard of war-period production would be maintained and in many localities surpassed.

Barring such unforeseen visitations as hailstorms, drought, and grasshoppers the crop results of the past year will be highly satisfactory throughout the Indian country. A most encouraging element is the greater use of agricultural machinery and a tendency to adopt modern improved methods of tillage.

In cotton-producing sections high-grade Pima seed has been furnished Indian farmers, and their crops are comparing well with those of the best white farmers.

The Indians have made continued progress in the live-stock industry even against the occurrence of successive droughts in some sections. They are showing special interest in the improvement of breeds by the purchase of first-class sires.

In addition to the natural increase there were purchased during the year approximately 3,200 cows and heifers and 450 steers. The

suppression of contagious diseases has progressed satisfactorily, and on several reservations in the Northwest, ranges are reported to be free from infected animals.

Irrigation.—Much allotted land of minors and adults who, from age or other disabilities, can not cultivate their entire holdings, is leased on favorable terms to white farmers, and production thus increased with profit to all concerned.

Advanced cost of labor and material for irrigation construction has been measurably offset by the greater use of machinery, such as dredges, dragline excavators, ditch cleaners, etc., thus also overcoming labor scarcity. The Yakima, Wash., project has been extended, and with new land under cultivation the gross yield was approximately \$9,000,000. The Fort Hall, Idaho, Reservation will surpass previous years in products by irrigation, and in Montana the Crow lands under ditch tided that country over great drought severities.

The Fort Belknap Reservation in Montana is an example of progressive irrigation methods by the Indians who do practically all of the farming.

Additional wells have been installed in the Papago country, and, with the operation of the old ones, further increases the stock-raising industry, which is the chief means of support.

The water problem of the Navajo and Hopi in Arizona and New Mexico is slowly yielding to solution by the sinking of wells to supply drinking water for herds in areas of pasture that would otherwise be wasted. There are now 1,000,000 sheep and goats on the reservation of these Indians, and with sufficient funds, thousands of acres, affording reasonably good forage, can be utilized to increase their herds.

Aid has been extended to the Pueblo of New Mexico, and sanitation in their villages has been improved in some instances by the installation of domestic water supply, drainage, and sewer systems.

Allotment, sale, and leasing of land.—On the Gila River Reservation in Arizona 1,213 allotments of irrigable and nonirrigable land were made during the year, also 270 allotments, of 80 acres each, were made on the Umatilla Reservation, Oreg., and approximately 1,000 reallotments were made, under provision of law, on various reservations.

Allotments were made to 16 Indians in various national forests, and a total of 315 allotments, comprising 46,207 acres, were made on the public domain.

During the year 907 pieces of Indian land, covering 115,367 acres were sold for \$2,803,232, an average of \$25.65 per acre, the highest average price ever received from like sales.

The leasing of agricultural land in excess of the amount the Indians can cultivate was continued with good results, particularly on

the Uintah and Ouray Reservation in Utah, where the leasing of about 70,000 acres of irrigable allotted land was practically completed as a measure of saving the Indians' water rights which, under the law, would have been forfeited by the close of the year in default of making beneficial use of the water.

The Five Civilized Tribes.—To date of June 30, 1919, 3,578,934.38 acres of tribal land had been sold for \$20,376,096.27, being \$4,536,108.67 more than the appraised value. The estimated total value of unsold tribal property of the several tribes is as follows:

Choctaw and Chickasaw Nations.....	\$17, 689, 720
Creek Nation.....	172, 200
Seminole Nation.....	38, 900

Only one tract of 10 acres of the Cherokee Nation remains unsold.

During the year a competency commission visited the Creek Tribe at their homes to determine who are capable of handling for themselves all business transactions affecting their allotted lands. Restrictions on 57,000 acres of allotted land were removed.

Money was disbursed to individual Indians last year from land sales, equalization, royalties, and per capita payments amounting to \$7,812,331.44, an increase of more than three millions, and houses, barns, improvements, equipments, and miscellaneous articles were constructed and purchased at a total cost of \$1,110,618.53. The Indian farmers responded beyond expectations to the emphasis laid upon agriculture and stock raising, and the Five Tribes scored a splendid record in the purchase of Liberty bonds, war savings stamps, and the number, estimated at 4,000, who were in military and naval service.

The Indian exhibit.—The Indian exhibit at the Interior Department Exposition held in May, 1919, consisted of enlarged photographs showing the educational and industrial progress of the Indians; how they helped to win the war by service in the Army and Navy, the purchase of Liberty bonds, Red Cross work, and food production. Specimens of native Indian handicraft, such as beadwork, hand-embroidered garments, artistic designs in laces and bags, and various similar articles made by Indian pupils, were shown; also canned and preserved fruits and vegetables, and many interesting products of the domestic science and art classes and the mechanic art shops of the Indian schools.

Forestry and road work.—The larger timber sales of the year were the eastern division unit, on the Tulalip Reservation, consisting of 65,000,000 feet; the Omak unit of 25,000,000 feet, on the Colville Reservation; the Stinking Lake unit, 25,000,000, on the Jicarilla Reservation; and the Northern Spring Creek unit, of 26,000,000, on the Klamath Reservation. A sale of 6,000,000 feet, known as the Big Bend unit, on the Klamath, was made late in the year, and the

Camas Creek unit, of 24,000,000 feet, on the Flathead Reservation, was advertised for the receipt of bids on July 15, 1919. The Apache Lumber Co. has been engaged in erecting a large mill within the area purchased by it on the Fort Apache Reservation in 1917. Approximately 30,000,000 feet have been cut under the contract of the International Lumber Co. on the Red Lake Reservation. A more intelligent and comprehensive system of laying out and maintaining highways on the reservations is being developed under the congressional appropriation available for this purpose, and as the Indians are more and more appreciating these essentials of modern economical development greater progress is anticipated. Indian labor is largely employed for road work, with the exception of the necessary experienced supervision, for which white foremen must be used.

Probate work.—Under congressional limitation of probate attorneys to matters affecting restricted allottees or their heirs, individual cases are receiving more effective attention. This work in Oklahoma, which for part of the year was retarded as a result of diminished service caused by the war, is proceeding normally.

Steps will be taken to test the constitutionality of a recent act of the Oklahoma Legislature changing the rules of probate procedure, which previously as adopted by the State supreme court had been uniform, to a system authorizing each county judge to promulgate rules governing the procedure in his court. The new plan, permitting each of 40 counties to have a different set of rules, if sustained, will severely cripple the bureau's probate organization.

During the year attorneys appeared in 7,024 regular cases, instituted 270 civil actions, involving \$268,638, and finally determined 232 civil actions, besides attending to a large volume of other probate work.

In the probating of estates of deceased Indians outside the Five Civilized Tribes, 2,414 cases were finally disposed of. One thousand eight hundred and eighty-seven of these related to estates under trust patents, 176 to restricted-fee patents, 51 to personal property, and 97 to inherited interests. One hundred and eighteen will cases were received, 75 of which received action. Fifteen examiners of inheritance held hearings in 26 reservations. Miscellaneous cases pertaining to probate work to the number of 2,914 were also disposed of.

Mineral interests.—During the year oil leases on certain lands of the Osage Indians aggregating 95,337 acres were sold for a bonus consideration of \$10,299,900, in addition to royalties, an average of about \$101 an acre. Also gas leases on 511,488 acres were sold for a bonus of \$1,173,920.48.

On Osage lands at the close of the year there were 4,442 producing oil wells, 468 producing gas wells, and 124 wells being drilled. The year's gross production of oil was 12,138,086 barrels, of which the

Osage Tribe received 2,043,458 barrels. The total receipts for the year from oil and gas accruing to this tribe approximated \$17,000,000.

In the Five Civilized Tribes, 717,594 acres were under leases for oil and gas. The year's total production of oil on restricted land was 10,180,862 barrels and the total revenue from oil and gas \$4,073,985.22. During the year 495 wells were drilled, 307 producing oil and 57 producing gas.

Outside the Five Civilized Tribes in Oklahoma the Indians on the Kiowa Reservation received about \$800,000 from oil and gas and those of the Otoe Reservation received \$50,589.48 from like sources. Producing wells on the Pawnee and Ponca Reseryation are also bringing a substantial income.

In the Seneca jurisdiction there has been a great development of lead and zinc mining, resulting in a mining center of about 50,000 population and a tenfold increase of agency business.

Under recent legislation metalliferous minerals on unallotted Indian lands in Arizona, California, Idaho, Montana, Nevada, New Mexico, Oregon, Washington, and Wyoming will be under exclusive control of the bureau.

Miscellaneous matters.—Forty per cent of reimbursable funds expended for individual Indians has been repaid. The balance is not delinquent, as it is payable in installments. The beneficiaries as a rule have been doing well and in many cases need no further assistance. Tribal herds established from such funds have been profitable, and these are a guaranty of payment. Eventually this stock will be placed among individual Indians.

The disbursement of individual Indian funds to both adults and minors is proceeding under more liberal principles in furtherance of the gradual emancipation of the Indians from Government control, and if an adult Indian is at all competent he is given unrestricted control of his funds. During the year over \$10,000,000 of individual moneys were paid directly to the Indians or expended for their benefit.

One of the principal per capita payments of the year was the distribution of \$200,000 among the Indians of the Uintah and Ouray jurisdiction in Utah, a portion of which was applied to special advantage in supplying irrigation to allotments and securing water rights to the Indians.

Indians in New York.—Unusual problems have arisen in connection with the affairs of some 5,000 Indians still in New York who own seven reservations, including over 80,000 acres. The State has for some time exercised extensive jurisdiction over these Indians, and there has been supervision by the Federal Government on various matters. Recent court decisions have tended to strengthen the view that the State is without power to deal with their tribal

property rights. A commission authorized by the New York Legislature to take up with Congress and the Federal departments the question of jurisdiction and administrative control of their affairs has not yet formulated its course of action, so that a more definite statement can not at present be made.

The Florida and Texas bands.—Encouraging progress is being made in behalf of the Seminoles of Florida. Their interests are being supervised by an experienced field-service man whose degree of Indian blood gives him fortunate access to the nature and needs of this band. An industrial center is being created for the purchase of small beginnings in live stock, awakening their interest in education and conserving their health.

An appropriation of \$5,000 is being used in constructing a school building for the Alabama Indians in Texas, to be completed for the coming school year, which will accommodate all their children of school age.

Homeless Indians in California.—Two inspecting officers have been detailed under explicit instructions to make a thorough survey and study of the nonreservation Indians in California and their needs, concerning whom conflicting reports as to their health, poverty, and moral condition have been received. When completed this survey will afford an intelligent basis for action. Lands and homes for certain of these Indians were purchased during the year at an approximate expense of \$16,000.

Papago land litigation.—There is pending at this time in the Supreme Court of the District of Columbia a case which is regarded as one brought to test the validity of 16 purported quit-claim deeds attempting to convey to one Robert F. Hunter, late of Washington, D. C., a one-half undivided interest in 16 tracts of land alleged to represent the "lands and grants" of certain Papago Indian villages located in Pima County, Ariz., and now embraced in the Papago Indian Reservation created by Executive order of February 1, 1917. The lands in which the interest is attempted to be conveyed aggregate approximately 2,600,000 acres.

In this suit are involved questions of title to practically all the land embraced within the limits of the present Papago Indian Reservation, and its successful prosecution is of vital interest to the Papagos of that country. For this reason a special supervisor of this office has for the past year been engaged in a thorough investigation of the entire situation and in assisting the Department of Justice.

PENSION OFFICE.

Number of pensioners.—There were on the roll at the end of the fiscal year 624,427 names, a net loss of 22,468 from the total of 646,895 on the roll at the beginning of the year.

The number of Civil War soldiers on the roll June 30, 1918, was 298,808, and on June 30, 1919, 271,391, showing a decrease of 27,417. The number of deaths of Civil War soldiers in 1919 was 27,703, as against 30,466 in 1918.

The number of Civil War widows on the roll June 30, 1918, was 288,815, and on June 30, 1919, 293,244, showing an increase of 4,429.

The deaths of widows, minor children, and dependents in 1919 numbered 19,217, as against 18,412 in 1918.

The highest number of Civil War soldiers on the roll was in 1898, when there were 745,822. The highest number of Civil War widows on the roll was in 1912, when there were 304,373.

Of the War of 1812, there were surviving on June 30, 1919, 81 widows.

Of the War with Mexico, there were on the roll June 30, 1919, 215 survivors and 2,739 widows.

Of the War with Spain, the total number of original claims allowed by the bureau is 41,335. The number on the roll June 30, 1919, by reason of the War with Spain, is 28,251.

Unexpended balances of appropriations.—The unexpended balances of appropriations at the end of the fiscal year were as follows:

For Army and Navy pensions.....	\$947, 170. 97
For fees and expenses of examining surgeons.....	38, 771. 74
For salaries.....	118, 419. 86
For per diem and expenses of special examiners.....	None.

Disbursements for pensions.—The amount disbursed in the payment of pensions for the year was \$222,159,292, as against \$179,835,329 for the preceding year. The amount appropriated for the payment of pensions for the fiscal year 1919 was \$223,000,000, as against \$183,000,000 for the preceding year. A deficiency appropriation of \$3,000,000 was made in addition to the original appropriation of \$220,000,000 for the fiscal year. The larger amount was due because of increases given by new legislation.

The number of pensioners residing in foreign countries in 1919 was 3,747, and the amount paid to these pensioners was \$1,188,188.

Certificates issued and applications filed.

Pension certificates issued on admitted claims during the fiscal year....	54, 984
Reissues in lieu of lost pension certificates (duplicates) during the year....	1, 335
Accrued pension orders issued during the year.....	20, 103
Widow's increase orders, act of Sept. 8, 1916, issued during the year ending June 30, 1919.....	81
Total.....	76, 503

There were received and classified in the Law Division during the year 61,756 applications of all kinds.

Division of pension.—Under the act of March 3, 1899, providing for division of pension of resident pensioners of the United States

who have deserted their wives or children or who are inmates of soldiers' or sailors' homes, 429 cases were acted upon.

Under the act of August 8, 1882, of all claims of widows and children of pensioners undergoing imprisonment or insane without a guardian, 26 cases were acted upon.

New legislation.—The act of July 16, 1918, provides pension to widows and minor children of officers and enlisted men who served in the War with Spain, the Philippine insurrection, or in China:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That from and after the passage of this act if any volunteer officer or enlisted man who served ninety days or more in the Army, Navy, or Marine Corps of the United States, during the War with Spain or the Philippine Insurrection, between April twenty-first, eighteen hundred and ninety-eight, and July fourth, nineteen hundred and two, inclusive, service to be computed from date of enlistment to date of discharge, or any officer or enlisted man of the Regular Establishment who rendered ninety days or more actual military or naval service in the United States Army, Navy, or Marine Corps in the War with Spain or the Philippine Insurrection between April twenty-first, eighteen hundred and ninety-eight, and July fourth, nineteen hundred and two, inclusive, or as a participant in the Chinese Boxer rebellion campaign between June sixteenth, nineteen hundred, and October first, nineteen hundred, and who has been honorably discharged therefrom, has died or shall hereafter die leaving a widow without means of support other than her daily labor, and an actual net income not exceeding \$250 per year, or leaving a minor child or children under the age of sixteen years, such widow shall upon due proof of her husband's death, without proving his death to be the result of his Army or Navy service, be placed on the pension roll from the date of the filing of her application therefor under this act, at the rate of \$12 per month during her widowhood, and shall also be paid \$2 per month for each child of such officer or enlisted man under sixteen years of age, and in case of the death or remarriage of the widow, leaving a child or children of such officer or enlisted man under the age of sixteen years, such pension shall be paid such child or children until the age of sixteen. *Provided,* That in case a minor child is insane, idiotic, or otherwise permanently helpless, the pension shall continue during the life of said child, or during the period of such disability, and shall commence from the date of application therefor after the passage of this act: *Provided further,* That said widow shall have married said officer or enlisted man previous to the passage of this act: *Provided, however,* That this act shall not be so construed as to reduce any pension under any act, public or private.

Under this act pensions have already been granted to 992 widows, 72 minor children, and 1 helpless child.

Attention is called to the fact that a distinction was made between services of volunteer officers and enlisted men and those in the Regular Establishment as a prerequisite to the allowance of widows and minors pensions in said act. In the case of Anna, as widow of Oscar J. de Rochmont, decided by the Assistant Secretary of the Interior, January 31, 1919, it was held:

Volunteer officers and enlisted men mentioned in the act of July 16, 1918, refer to those who were members of volunteer organizations as distinguished from the Regular Establishment.

Their dependents are pensionable if such an officer or enlisted man served during the period of any of the wars mentioned in said act for 90 days or more and was honorably discharged, independent of the geographical locality of such service.

The dependents of an officer or enlisted man of the Regular Establishment are not pensionable under said act unless such officer or enlisted man rendered actual service. "Actual military service" mentioned in said act are words of limitation, and are descriptive of such duty in a war as is to be performed by one in the Army and Navy from being on the scene of conflict; that is to say, at the theater of operations on sea or land, of invasion of enemy territory, of repelling invasion by the enemy, and the like.

When the bill was pending before the House of Representatives, Mr. Keating of Colorado, in charge of the bill, made a preliminary statement, page 9672 of the Congressional Record of July 9, 1918:

This bill does not provide pension for the widow or the minor children of a soldier or sailor of the Regular Establishment unless he actually left the confines of the United States and participated actively in the War with Spain.

In the case of Rebecca, as widow of Jeremiah Cottrell, decided by the Assistant Secretary of the Interior, May 19, 1919, it was held:

Enlistments in the Navy under the naval appropriation act approved May 4, 1898, for the naval service for the fiscal year ending June 30, 1899, were enlistments in the Regular Naval Establishment, and such persons were not "volunteer officers or enlisted men" as are mentioned in the act of July 16, 1918. The claimant's husband was enlisted under the provisions of the act of May 4, 1898, was a member of the Regular Naval Establishment, and as his entire service was outside the zones of conflict in the War with Spain, Philippine insurrection, or Chinese Boxer rebellion campaign, his widow has no title to pension under the act of July 16, 1918.

Special acts of Congress.—During the year 28 omnibus bills to grant pensions by special acts of Congress were enacted into law. These acts granted pension or increase of pension to 3,442 individuals, among whom was the widow of ex-President Roosevelt.

Marriage and divorce.—Many claims require determination of the marital status of the parties. During the fiscal year 589 such cases required formal opinions by the Law Division for their determination. The fact that hardly any two States have the same laws concerning marriage and divorce complicates the situation. Complaint has been made with increasing volume because of the rigorous requirements of the law, and the practice in the Pension Bureau, as to proof of validity of the marriage relation. After living with the soldier as his wife for a long period, as his widow a claimant is often called upon to show the soldier's previous marital history for a period sometimes covering more than 40 years. Under existing laws the Pension Bureau has no power to change its practice in this respect, and as the hardship imposed upon worthy women increases with the lapse of time, it is thought that Congress should pass some legislation looking to relief. It might, for instance, declare that

cohabitation for a fixed period of time up to the date of the soldier's death should give rise to a conclusive presumption for pensionable purposes, that the wife thus cohabiting is the legal widow of the soldier to the exclusion of any other.

Lands for the loyal.—Secretary Lane's plan to furnish land and homes to our soldiers and sailors who fought in the world war is in keeping with the former policy of the Government. For service in wars prior to 1855 the Pension Bureau issued land warrants to 798,701 applicants, embracing 68,793,870 acres.

Monthly payment of pensions.—There seems to be a general demand among soldiers and soldiers' widows for the monthly payment of pensions. The need of payments at shorter periods than quarterly is patent to everybody. An estimate has recently been furnished the Committee on Invalid Pensions in the House of Representatives showing that for the current year an additional appropriation of \$175,000 would cover the expense involved in the change. From February 1, 1913, when the system of paying pensions through a disbursing office in the bureau was established to take the place of the agency system, to June 30, 1919, there was paid out in pensions a total of \$1,140,433,323.10 without a single item being disallowed by the officers of the Treasury for improper payment. At the beginning of the period the force employed in paying pensions numbered 275, the pensioners on the roll, 837,000; at its close, 163 and 624,427 respectively.

Pension Bureau work.—The Pension Bureau has by years of study, training, and experience built up an efficient system of handling pension claims. It has a highly skilled corps of examiners, who by training, study, long experience, and knowledge of the various pension laws and decisions, have become expert in determining the rights of claimants to pension. It also has a highly competent, technical, and experienced corps of medical examiners who pass upon all medical questions arising in a claim, and a field force whose duties are to investigate doubtful or difficult claims and those in which criminal features are involved. The bureau has equipment and electrical machinery for preparing and mailing millions of checks each year. This equipment and machinery is operated by highly skilled employees.

Should Congress provide for civil-service retirement, the monthly payment of pensions, and the transfer of the compensation feature of the Bureau of War Risk Insurance to the Bureau of Pensions, this bureau could easily assimilate and dispose of the additional work entailed at a minimum outlay for clerk hire and other necessary expenses.

Age of employees.—The following statement shows the number, ages, etc., of employees in the Pension Bureau on the 1st day of

July, 1919, considered especially with reference to civil-service retirement:

Number in classified civil service.....	874
Age of oldest employee.....	88
Number over 80 years of age.....	26
Number between 65 and 80 years of age.....	266
Based on age of 65, number eligible for retirement.....	292
Percentage of all employees eligible for retirement.....	33.4
Average age of all employees July 1, 1919.....	58

Metal boxes for the files.—In former reports statements have been made showing the superiority of metal boxes for the files over the leather strap heretofore used. The metal boxes cost about 64 cents as against 80 cents for a strap, and the life of a box is indefinite, whereas a strap only lasts a few years. A total of 23,500 boxes have been purchased, and it is estimated that 56,462 more boxes would be sufficient in which to place all the files.

PATENT OFFICE.

During the first half of the year, owing to war conditions, there was a noticeable falling off in the number of applications for patents filed. After January 1, 1919, however, a steady increase in the number of applications became noticeable, and at the end of the year the receipts were fully normal. During the year a total of 75,657 applications for patents, including reissues, designs, trade-marks, labels, and prints were filed. This was 2,350 more than were received during the preceding year ending June 30, 1918, and 5,882 less than for the year ending June 30, 1914, when the receipts reached the maximum number in the history of the office. During the year 8,354 applications were forfeited for failure to pay the final fee, but this number is less by 1,159 than that of the previous year. The total number of patents granted and trade marks, prints, and labels registered was 43,353. This was 2,725 less than in the preceding year and 10,124 less than in the year 1916. The receipts of the office for the year were \$2,113,350.17, being an increase of \$9,689.61 over the preceding year.

BUREAU OF EDUCATION.

Statistics.—During the year a representative of the Bureau of Education has visited 12 States for the promotion of the bureau's plan to secure the cooperation of State departments in the adoption of a uniform system of compiling and reporting statistics. The plan is to give recognition to State departments as the center from which all educational reports come, and from which all authentic data concerning educational institutions, public and private, may be obtained. As a result of this plan:

1. Comparable statistics for all States will be secured and made available by the Bureau of Education.
2. Local school officers will be relieved of the duty of making numerous reports in different forms.
3. The State department of education will gain in prestige and recognition as the head of the entire educational system of the State.

Correspondence.—First-class mail matter received by the Bureau of Education during the year amounted to 227,958 pieces, an increase of 65,479 from the number received in 1918. These numbers include both the Washington and field offices.

Library.—The library continued to acquire new additions of publications as they were issued and also added material of earlier date. Among the most unique and comprehensive collections acquired is that of textbooks used in elementary and secondary schools of the Argentine Republic and Brazil. The library has secured nearly all of the new European books on education published by friendly nations during and since the war. In addition to educational bibliographies compiled and circulated, a series of leaflets were issued, monthly records of current educational publications, and the 1918-19 sections of the Educational Directory revised.

Publications.—During the year the bureau has had printed a greater number of documents than in any other similar period of its history. One million five hundred and five thousand four hundred and forty-eight of these were distributed by the mailing division, and, in addition, 1,396,518 mimeograph letters were sent out. Bulletins on all the important phases of education were published and distributed; leaflets on secondary and higher education, circulars, reading courses, and lessons were distributed. School Life, a bureau publication issued twice a month, has a circulation of 20,000. School Service, another bureau publication distributed semi-monthly during the early part of the year with a circulation of 583,000, was discontinued on May 1.

Educational surveys.—A number of educational surveys were carried on during the year, among which are the following: A study of the educational system, elementary, secondary, and higher, in the State of Alabama; a study of consolidation in Mount Joy Township, Pa.; survey of Belle County, Tex.; survey of the following cities: Memphis, Tenn.; Columbia, S. C.; Passaic, N. J. All of these were made at the request of the school officials concerned with the administration of the schools surveyed.

Activities of the divisions of the bureau.—Besides engaging in the educational survey of Alabama, the Division of Higher Education passed upon the eligibility for accrediting by the United States Naval Academy of 473 institutions; prepared statistical reports con-

cerning higher institutions; represented the bureau at meetings and conferences on higher education; organized a series of conferences for the preparation of a course of study in agricultural education. The members of the division were intimately connected with the entertainment of the British Educational Mission and assisted in planning their itinerary to visit institutions in the United States.

Under the direction of the Rural Division, important conferences were held on rural education at Stevens Point, Wis., Daytona, Fla., and Oklahoma City, Okla. Conferences were attended by persons prominently identified with public affairs, and the bureau's program for rural school improvement was set forth. Members cooperated with States and institutions in several additional conferences and educational campaigns. The educational section of the Department of the Interior Exposition, held in the spring of 1919, was under the direction of this division.

Studies have been made as follows: Rural education in Nebraska; standardization of rural schools in the United States; the administration and supervision of village schools; principles of school legislation; status of rural teachers in Nebraska; certification of teachers in the United States; teachers' salaries; consolidation of schools in the United States. Members of the division participated in the educational survey of the State of Alabama, and made a survey of Mount Joy Township, Pa.

The Division in City School Administration participated in three educational surveys; prepared a bulletin on the phonic method of teaching reading; made studies on the causes of failure and non-promotion, and prepared and distributed circulars concerning educational legislation.

In the kindergarten section, leaflets were prepared on kindergarten promotion and assistance given in the campaign for kindergartens in Texas. This division also assisted the War Department in selecting equipment of kindergartens in the Government schools.

The specialists in industries and home making and agricultural and commercial education participated in conferences and prepared bulletins and circulars; assisted in several surveys and cooperated with other organizations—such as the Food Administration and the Young Men's Christian Association—in educational work.

The specialist in school hygiene and physical education cooperated with the Public Health Service and the Child Health Organization in the preparation of a health education series; assisted in surveys made by the bureau, and advised with county and State school boards concerning buildings. Studies were made on physical education in normal schools, janitor service in the city schools, and similar subjects.

The School Garden Army continued its work of organizing the school children of the country to cultivate gardens. Over 5,000,000 manuals and leaflets concerning garden instruction were distributed. Moving-picture films were shown to over 300,000 persons. At the end of the fiscal year, 1,813,352 children were enrolled in 2,125 cities of the United States. The total value of products for the year is estimated at \$48,000,000.

The Division for School Board Service registered 20,000 high-grade teachers during the year and made 15,000 nominations to school boards.

A Division of Educational Extension was maintained in the bureau for six months with an allotment of \$50,000 from the President's fund for national security and defense. Particular attention was given to Americanization work through the distribution of material concerning courses for teaching emigrants, books on the teaching of English, and the like.

By means of a cooperative agreement by the Secretary of the Interior and the American Nationalization Committee of New York, the regular work of the Bureau for Americanization was enlarged. One section was maintained in Washington and one in New York. As a result of the work done through this division, the importance of Americanization has been emphasized and the problem clarified; important laws have been enacted, Americanization societies organized, and the cooperation of a number of organizations and activities secured.

Alaska.—During the year the field force of the Bureau of Education in Alaska cooperated with the Public Health Service in an effort to furnish relief to the natives during the influenza epidemic. Nurses and doctors were sent from Washington State to cooperate with the bureau's physicians and nurses, all of whom were placed at the disposal of the governor and rendered zealous service in the native villages. People of the Territory and the Red Cross cooperated. The bureau continued the policy of encouraging the establishment of cooperative enterprises in native villages. By the congressional appropriation of \$75,000, the medical work of the bureau among the natives of Alaska was continued during the year. Physicians and nurses were employed and several hospitals erected in which native girls are trained for nurses. The superintendent of education for Alaska has assumed charge of the work of taking the 1920 census for Alaska.

War work.—All of the divisions of the bureau continued to do a large amount of war work until the armistice was signed and after. They have cooperated with the War Industries Board in passing on applications for promotion to direct school buildings and issue bonds.

The commissioner submits a series of 29 recommendations for better work and greater usefulness on the part of the bureau. He urges that its staff be greatly increased and made more than proportionally effective by the addition of an assistant commissioner, a private secretary to the commissioner, an assistant editor, a specialist and assistants in foreign educational systems, two collectors and compilers of statistics, additional specialists in higher education, rural and industrial education, commercial education, school hygiene, city school administration, community organization, and a greatly increased staff of stenographers and clerks. He asks that the statutory salaries of several members of the present staff be increased, and that the limitations on the salaries paid from lump-sum appropriations be removed.

To the present organization of the bureau the commissioner would add the following listed divisions:

1. For the study of exceptional children, both subnormal and super-normal, and the best methods of educating them.
2. For scientific experiments in methods of education.
3. For the study and eradication of adult illiteracy.
4. For Americanization work among the foreign-born population of the United States.
5. For the study of and help in the home education of children.
6. For educational extension work.
7. For a school board service to assist school boards in securing high-grade teachers.
8. For the study and establishment of model rural schools.

He asks for the reestablishment of the Division of Negro Education and Backward Peoples with an annual appropriation of 25,000.

For medical and relief work in Alaska and for the education of the Alaskan natives he desires appropriations, respectively, of \$125,000 and \$300,000. To these Alaskan activities he would add the work of assisting the natives to develop and establish their own remunerative industries.

Finally, the commissioner points out the very great need of a Federal educational building in which may be housed the bureau and the Federal Board for Vocational Education.

GEOLOGICAL SURVEY.

Nature of the work of the year.—During the first half of the fiscal year practically all the energies of the Geological Survey were concentrated on war work. A census of the country's resources of manganese, chromite, tungsten, and quicksilver and of oil, gas, and coal was made, field work was done to discover new deposits, and maps and data showing the distribution of the mineral deposits in foreign countries, their quality and extent, the output of districts

and regions, and the trade distribution of minerals in the world's commerce were prepared. These maps proved so valuable to all the agencies that used them that it has been decided not only to make them public but to continue and keep up to date the compilation of like data for the benefit of American industry and commerce.

The work of the last half of the year has consisted largely of the completion of the field projects undertaken and the orderly summation and conservation of the military and economic results. Classified estimates of the country's mineral reserves have been completed and made available for future use in war or in peace, sampling of minerals and estimates of quantities available have been followed by contributions to our knowledge of the mode of origin of ores or minerals, and the special military inquiries as to underground water, road-building materials, rare minerals, and other subjects examined have led to broader views and better methods of work. Some of the war work—for example, the preparation of frequent reports showing the rate of production and transportation of coal—has been carried along, to the advantage of both the producer and the consumer.

The appropriations for the work of the survey for the fiscal year 1919 amounted to \$1,437,745.50. The roll of members holding appointments from the Secretary at the end of the fiscal year numbered 967, a decrease of 33.

Geologic surveys.—The geologists of the survey were engaged during the year in finding, examining, and studying deposits of manganese, chromite, tungsten, zirconium, molybdenum, iron, salt, high-calcium lime, white clays, nitrates, potash, and sulphur, chiefly for the purpose of supplying military needs. A wall map showing the deposits of manganese ore in the United States classified as to types was prepared. Military maps of the country around several camps and training stations, with accompanying descriptions, were prepared and printed; data were gathered for the use of the staff of the Chief of Field Artillery in selecting sites for artillery ranges and cantonments; information was compiled on road-building material and on water supplies for the use of the Chief of Engineers in connection with the preparation of the progressive military map of the country, and information was compiled concerning the mineral deposits and production of other countries. Cooperation was arranged and put into effect with several States, universities, and councils of defense; special statements and summaries were prepared for the War Industries, Shipping, and War Trade Boards and the information that was of greatest immediate need to the public was promptly published through newspapers and technical magazines. Since the armistice was signed illustrated reports on the economic geology of the many deposits studied have been in prepara-

tion or are already published, and data have been compiled for the information of the War Minerals Relief Commission.

Cooperation with the Fuel Administration was continued, and commercial data on coal were mapped and filed so as to be readily available for the use of the Fuel Administration and other branches of the Government. The consideration of questions relating to the pooling and zoning of coal led to the preparation of a detailed and comprehensive scheme of classification of coals.

The search for new reserves of petroleum to supply war demands was continued.

The most important cooperative investigations were made with the Bureau of Mines and the War and Navy Departments in the search for helium-rich natural gas; with the Capital Issues Committee of the Treasury Department in examinations and reports on applications for capitalization; and with the Bureau of Internal Revenue in the compilation of the records of production of oil and gas fields, the calculation of the rates of depletion, and the formulation of rules to govern the application of income-tax laws to the depletion of oil and gas field properties.

The geologists of the survey cooperated in military and commercial investigations with the Ordnance, Aviation, and other branches of the War and Navy Departments, with the War Trade Board, the War Industries Board, the Fuel Administration, the Food Administration, the Capital Issues Committee, the Bureau of Internal Revenue of the Treasury Department, the Tariff Commission, the Bureau of the Census, the Bureau of Standards, the State Department, the Shipping Board, the Railroad Administration, the Federal Trade Commission, the Department of Justice, the Forest Service, and the Office of the Supervising Architect of the Treasury. In scientific investigations they cooperated informally with the Smithsonian Institution, the Bureau of Lighthouses, the Bureau of Fisheries, the Coast and Geodetic Survey, and the research laboratories of the Smithsonian Institution. Investigations have been undertaken or planned at the request of the Governments of the Dominican Republic, Haiti, the Virgin Islands, and Porto Rico, and assistance has been given to the geological departments of a number of colleges and universities.

The special investigations made for the military departments and branches of the Government included search for material for smudges, for porous rocks to be used in making more buoyant concrete ships, and for underground water for many cantonments and military and naval training stations, examination of target ranges, determination of locations for military storage places, examination and estimate of resources of natural gas, and investigations of resources of nitrate and potash both at home and abroad.

The restriction by an allied country of the exportation to America of high-grade clays near the end of the war led to an investigation in the eastern part of the United States of deposits of high-grade clays that might be used in making paper or in the manufacture of porcelain or of articles used in electrical equipment. A report on the investigation has been written for publication.

Studies were made of the geology and paleontology of the Canal Zone under an agreement between the Panama Canal Commission, the Smithsonian Institution, and the Geological Survey.

Geologic work was done in Porto Rico and the Virgin Islands with special reference to the ground water supply.

Certain reported deposits of chromite in the Dominican Republic were examined to determine whether the deposits were available for the military use of the United States.

Cooperative work on deposits of chromite and manganese in Cuba was done, and arrangements were made to render assistance to the Cuban Government in petrographic and paleontologic work.

The laboratory work included about 1,500 analyses and assays, among them more than 100 tests of rocks for platinum, a metal much needed for military use. Special determinations of the potash content of certain rocks were made.

Surveys in Alaska.—As most of the topographers and several of the geologists of the survey who had been working in Alaska either entered the Army or were assigned to work to be done in connection with the prosecution of the war it was not possible to continue the survey's work in Alaska in the customary way. The work done consisted principally of investigations of deposits of chromite and tin, surveys and examinations in the region that is being developed by the Government railroads, measurements of stream flow, and the usual census of the mineral production of the Territory.

Ten parties were engaged during 1918 in Alaska surveys and investigations. Eight of the parties were engaged in geologic surveys, one in topographic surveys, and one in stream gauging. The areas covered by reconnaissance geologic surveys on a scale of 1:250,000 (4 miles to an inch) amount to 3,500 square miles. Much of the time of the geologists was devoted to the investigation of special problems relating to the occurrence of economic minerals, the results of which can not be expressed in terms of area. About 1,200 square miles was covered by reconnaissance topographic surveys on a scale of 1:250,000 (4 miles to an inch). In cooperation with the Forest Service, stream gauging was continued in southeastern Alaska. Of the parties whose work may be classified geographically, three parties worked in southeastern Alaska, three in the Cook Inlet-Susitna region, one in the Yukon Basin, and two in Seward Peninsula.

Field work for the season of 1919 was begun before the end of the fiscal year by three parties.

The survey's branch office at Anchorage was maintained throughout the year to provide closer cooperation between the Geological Survey and the operators of the Government coal mines in the Matanuska Valley, as well as to aid the mining industry in the region tributary to the Government railroad, to keep in touch with local developments in mining and prospecting, and to furnish whatever aid may be rendered by giving information, advice, and publications to all who are engaged in mining and prospecting.

Statistics of mineral production.—Work in mineral statistics was carried on mainly for military purposes during the first half of the fiscal year.

Weekly statistics of the production of copper, lead, zinc, and aluminum were collected and were furnished to the Government purchasing agencies, a system of monthly reports covering the raw mineral materials that were of chief use in the war was established, and diagrams and tables showing not only the supplies available but the estimated requirements were prepared by the Geological Survey in cooperation with the War Industries Board and the mineral specialists of the Shipping Board. By contributions of geologic and statistical information and by the judgments of its trained specialists the Geological Survey aided the Capital Issues Committee in directing capital into those fields where it would be of maximum usefulness during the war.

During the year the survey contributed reports on mercury, graphite, phosphate rock, manganese, antimony, tungsten, magnesite, emery, corundum, bauxite and aluminum, and platinum to a series of mimeographed pamphlets issued by the Interior Department under the direction of the Bureau of Mines, showing the political and commercial control of these commodities throughout the world. Specialists of the survey also prepared chapters on mineral commodities and on economic conditions in Japan and Sweden for reports compiled by the Bureau of Research of the War Trade Board.

A voluminous index of the information on mineral resources in the possession of several Government organizations was compiled and was published in mimeographed form through the cooperation of the Central Bureau of Planning and Statistics.

The cooperation between the survey and the Fuel Administration in the collection of statistics of the coal and coke industries, begun in 1917, was continued throughout the year. Most of the details of this information will be published by the Fuel Administration, but summaries of the more essential data will be incorporated in the survey's volumes on the mineral resources of the United States.

Topographic surveys.—The new area mapped during the year was 10,068 square miles, making the total area mapped in the United States at the end of the fiscal year 1,289,958 square miles, or 42.6 per cent of the country. In connection with these surveys, 4,206 linear miles of primary and precise levels were run and 1,420 permanent bench marks were established. Primary traverse lines, aggregating 4,217 miles, were run, in connection with which 611 permanent bench marks were set. Triangulation stations numbering 61 were occupied and 50 were permanently marked.

In addition to 82 topographic maps and 69 accompanying tracings showing military information, a large wall map of the world was prepared for the use of the Shipping Board.

Detachments of enlisted men of the Four hundred and seventy-second Engineers, who were detailed to the Geological Survey for training in topographic-map drafting, assisted in drafting military maps in the office of the survey or were assigned to similar duty in other offices. In all, about 100 men reported for instruction.

Water resources.—Investigations of stream flow were continued by means of more than 1,200 gaging stations maintained in 38 States and in Hawaii and Alaska, and investigations of ground water were made in 12 States. Many investigations of the present and probable future use of both surface and ground water were made in connection with the classification of public lands, with special reference to their use for power under permit or for agriculture under the enlarged-homestead, desert-land, or Carey acts.

Investigations made in cooperation with the United States Fuel Administration of problems relating to the operation of power plants, interconnection of transmission systems, and substitution of water power for fuel power led to improvement in service and conservation of fuel. Statistical studies of power resources and output were continued after the armistice was signed.

Many reports based on special field investigations and office studies were prepared and submitted to the War Department and to boards and bureaus engaged in the conduct of the war, the work including the compilation of information concerning water supplies from springs and wells in different parts of the country, as well as maps and descriptions of water supplies along the international border and the Atlantic coast. During the war information and advice were given to the War and Navy Departments in regard to water supplies at about 100 military and naval establishments in the United States, such as cantonments, forts, navy yards, aviation fields, powder factories, arsenals, and supply depots.

The manuscripts and maps for two reports on desert watering places were completed and work on other like reports was well ad-

vanced, this work being done under a comprehensive plan for mapping and marking the watering places in the arid region east of the Sierra Nevada and the Cascade Range and west of a line running from eastern Oregon through Salt Lake City and Santa Fe to the mouth of Pecos River.

Land classification.—Public lands aggregating 6,439 acres were classified as to their content of coal, 3,703 acres being classified as coal land and 2,736 acres as noncoal land. The coal land withdrawn from entry during the year amounted to 2,415 acres; the land restored to entry after classification and appraisal amounted to 3,331,552 acres.

The probable oil land withdrawn from entry amounted to 239,946 acres; the land restored to entry as nonoil land amounted to 931 acres. The result of the year's work was an increase of the area of oil reserves from 6,519,819 to 6,758,834 acres.

The net result of the withdrawals and restorations of oil-shale lands has been to reduce the oil-shale reserves 3,754 acres, leaving 128,267 acres reserved, practically all of it for the use of the Navy. In addition, 129,421 acres have been classified as to their content of oil shale, of which 4,080 acres were classified as nonmineral land and 125,341 acres were classified as lands valuable as a source of petroleum and nitrogen. A total area of 4,117,377 acres is now classified as oil-shale land and valuable for minerals, so that the grand total of oil-shale land now classified or withdrawn is 4,245,644 acres.

The area included in phosphate reserves remains the same as it was a year ago—2,724,394 acres.

The existing potash reserves were reduced by the restoration of 440 acres, leaving the area of outstanding reserves 130,029 acres.

The land withdrawn for power sites amounted to 7,392 acres, and the land restored amounted to 6,037 acres, the total area now so reserved aggregating 2,565,727 acres.

Lands amounting to 8,452,637 acres were designated as nonirrigable under the enlarged-homestead act, and designations of land amounting to 5,251 acres previously classed as nonirrigable were canceled on information that the lands are irrigable. The net increase in the area classified under these acts was 8,447,383 acres, and the total area so classified was 288,797,241 acres.

At the end of the year 20,181,868 acres had been designated as subject to entry under the stock-raising homestead law of December 29, 1916, as the result of field examination and office study. The number of applications pending under the law on June 30, 1918, was 34,649, and the applications received during the fiscal year 1919 amounted to 14,218, making a total of 48,897 in hand. Of this number 29,176 were disposed of during the year, leaving 19,721 cases on hand.

The area added to the public water reserves during the year amounted to 22,422 acres, and the area eliminated from such reserves amounted to 1,375 acres, a net increase from 204,634 to 225,681 acres.

The cooperation with the General Land Office, under which reports are submitted by the survey containing information as to the mineral value and water resources of lands for which applications under the public-land laws have been filed, was continued unchanged during the year. Similar cooperation exists with the Indian Office. In addition to 1,532 requests for information as to mineral character, power value, and value for public watering places pending June 30, 1918, 5,034 such requests were received during the fiscal year. Of these requests 4,259 were acted upon, leaving 2,307 awaiting action at the end of the year.

At the beginning of the year 295 requests for information as to mineral character only were pending, and during the year 1,665 such requests were received. Reports were made on 971 of these requests, leaving 989 pending at the end of the year.

During the year 151 requests for report as to water resources only were received, and 35 were pending at the beginning of the year. Reports were submitted on 151 requests, leaving 35 pending June 30, 1919.

The survey also furnished to the General Land Office reports upon the feasibility of irrigation projects and proposed power developments under the terms of the general plan between the two bureaus. Closely related to this cooperation is the duty of the survey to classify land under the enlarged and stock-raising homestead acts and to prepare appropriate orders for departmental approval designating lands under those acts.

Publications.—The Geological Survey's lithographic plant continued its war work for bureaus, boards, and offices of the War Department, the Navy Department, and other branches of the Government, the product including aviation maps and military maps of camps and other areas in the United States and abroad, charts, diagrams, and other work in editions aggregating several hundred thousand. Thirty new topographic war maps were photolithographed and printed and nine special maps showing Army camps and cantonments were compiled and printed with special texts on their backs.

Regular topographic maps of areas in the United States numbering 140 were engraved and printed. Editions of 360 different maps, amounting to 945,293 copies, were published.

Contract and miscellaneous work involving the printing of 2,935,543 copies was done, and the total number of copies of all work printed amounted to 3,881,819, an increase of nearly 20 per cent over the work done in the preceding fiscal year.

The regular series of the survey's publications printed at the Government Printing Office included 147 reports, aggregating 11,644 pages. During the year the survey distributed 465,826 books, 8,865 folios, and 538,396 maps.

RECLAMATION SERVICE.

It is now 17 years since the passage of the reclamation act, during which the surveys, examinations, and construction therein authorized have proceeded under the provisions of that act and other acts amendatory thereof and supplementary thereto. During the present year the service is in position to deliver water to about 1,600,000 acres of irrigable land, covered by crop census, of which about 1,120,000 acres are now being irrigated. Besides this storage water is delivered from permanent reservoirs under special contracts to about 950,000 acres more. The projects that have been undertaken have been planned to provide for an area of about 3,200,000 acres. This latter figure is tentative and subject to variation in accordance with the development of plans as the work progresses.

Drought conditions.—A large portion of the arid region has been subject to severe drought for the past two years, leading to heavy losses on the part of those attempting to cultivate the soil without irrigation and leading to shortage of water supply in many irrigated regions. The reclamation projects have been remarkably free from drought conditions, owing to the ample storage provisions usually made, the only notable exception being a small project in northern Washington where the drought conditions are so intense that shortage has been suffered on a few thousand acres of irrigated land. The general requirement for irrigation, together with the striking success of agriculture under the Government projects, has greatly stimulated demands for the extension and completion of existing projects and the construction of new ones.

Investigations of new projects.—Investigations have indicated the feasibility of many large projects in various parts of the West. Many of these, however, require far more work in surveys and estimates to make them available for construction, and liberal appropriations have been made by various States for this purpose, frequently on the condition that an equal amount of money be advanced for the same purpose by the General Government. The major portion of the investigation work now carried on by this service is expended under such contracts, the local contribution being made in some cases by the States and in others by voluntary associations.

Projects and extensions of projects investigated by the Reclamation Service in the Western States.

State and project.	Irrigable acreage.			Mean altitude.	Mean rainfall.	Probable cost. ¹	Readiness for construction.
	Public.	Private.	State.				
Arizona:				<i>Feet.</i>	<i>Inches.</i>		
Yuma Mesa.....	33,000	8,000	4,000	180	3	\$7,500,000	Ready.
San Carlos.....	² 40,000	30,000		1,500	10	13,600,000	Not ready.
California:							
Imperial Valley.....	400,000			—200	3½	52,000,000	Ready.
Palo Verde.....		40,000		250	3	5,000,000	Not ready.
Turlock-Modesto.....		260,000		95	12	5,000,000	Do.
Kings River.....		400,000		225	10	12,000,000	Do.
Orland extension.....		30,000		245	18	2,500,000	Ready.
Iron Canyon.....		250,000		230	17	35,000,000	Not ready
Colorado:							
Grand Valley.....	15,000	15,000		4,825	8	600,000	Ready.
Grand Valley drainage.....		30,000		4,650	8	1,200,000	Do.
Orchard Mesa.....		9,700		4,750	8	800,000	Do.
Uncompahgre.....	10,000	37,000		5,500	9½	500,000	Do.
Montezuma.....		42,000	8,000	5,900	12	3,500,000	Not ready
San Luis Valley drainage.....		400,000		7,600	7	10,000,000	Ready.
Idaho:							
Hillcrest.....	3,000	10,000	1,000	2,800	13	700,000	Do.
Black Canyon.....	3,000	35,000	1,000	2,400	12	2,000,000	Do.
Minidoka.....	95,500	250	6,750	4,300	12½	15,000,000	Not ready.
Hansen Butte.....		22,000		4,150	11	2,000,000	Ready.
Gem district.....		27,000		2,350	12	750,000	Do.
Lake Walcott.....	2,480		20	4,400	12½	215,000	Do.
American Falls Reservoir.....	³ 33,000	33,000		4,300		12,000,000	Not ready
Island Park Reservoir.....	⁴ 10,700	5,000		6,250	15	4,000,000	Ready.
Boise Valley drainage.....		30,000		2,500	12½	600,000	Do.
Payette Valley drainage.....		10,000		2,250	11½	180,000	Do.
Montana:							
Milk River—Chinook division.....		50,000					Not ready.
Beaver Creek division.....	10,000		708	2,200	14	1,700,000	Ready.
Cut Bank.....	² 25,000	11,000		3,800	13	1,200,000	Not ready.
Sun River.....	35,000	30,000		4,100	11	4,000,000	Ready.
Bitter Root.....		30,000		3,450	11	1,500,000	Not ready.
Nebraska:							
North Platte extensions.....	65,000	88,000	10,000	4,100	13	9,000,000	Ready.
Dawson County.....		45,000		2,700	22	2,500,000	Not ready
Farmers Canal.....		50,000		2,600	22	2,000,000	Do.
Nevada:							
Upper Carson.....	3,500	35,500		4,800	12	2,000,000	Ready.
Pyramid Lake.....	15,000	1,000		4,000	4	1,200,000	Do.
New Mexico:							
San Juan.....	⁶ 125,000			5,200	8	(⁶)	Not ready.
Middle Rio Grande drainage.....		100,000		4,800	7½	5,500,000	Ready.
Oregon:							
Klamath pumping units.....		23,000		4,100	12	1,200,000	Do.
Langell Valley.....		17,000		4,200	12½	1,000,000	Do.
Tule Lake.....	17,000			4,000	14	1,250,000	Do.
Rogue River.....		30,000		1,600	20	2,000,000	Not ready.
Greater Umatilla.....	3,500	{ 12,000 73,050 }		500	8½	3,100,000	Do.
Owyhee.....	6,000	17,000		2,200	10	2,100,000	Do.
Deschutes.....		200,000		3,200	9	12,000,000	Do.
Lower Powder River.....	⁸ 38,000	25,000		3,000	13	7,000,000	Do.
Horsefly Storage.....	2,000	1,400		4,100	12½	300,000	Do.
South Dakota:							
Belle Fourche extension.....	11,000	22,300	3,917	2,800	14½	700,000	Do.
Texas:							
Tornilla-Fort Hancock unit.....		27,000		3,500	8	1,200,000	Do.
Utah:							
Castle Peak.....	70,000			5,200	9	7,000,000	Do.
Price River.....	30,000			5,500	12	(⁶)	Do.
Dixie.....	30,000			3,000	8½	(⁶)	Do.
Utah Valley drainage.....		30,000		4,500	18	1,000,000	Do.

¹ These estimates must be considered as merely preliminary and subject to change.

² Indian.

³ In Fort Hall Indian Reservation.

⁴ In Targhee National Forest.

⁵ In Navajo Indian Reservation.

⁶ No estimate.

⁷ Railroad.

⁸ 17,000 withdrawn under Carey Act

Projects and extensions of projects investigated by the Reclamation Service in the Western States—Continued.

State and project.	Irrigable acreage.			Mean altitude.	Mean rainfall.	Probable cost. ¹	Readiness for construction.
	Public.	Private.	State.				
Washington:				<i>Feet.</i>	<i>Inches.</i>		
Yakima High Line.....	13,600	130,000	6,000	1,000	7	\$20,000,000	Not ready.
Kittitas.....	5,000	62,500	2,500	1,800	9½	8,500,000	Ready.
Wyoming:							
Riverton.....	31,000	40,000	13,000	5,100	19	6,000,000	Do.
Frannie extension.....	35,000	1,000	1,800	4,200	6	500,000	Do.
Heart Mountain unit.....	34,100	1,500	3,200	4,900	6	3,300,000	Not ready.
Willwood unit.....	14,700	320	600	4,300	6	900,000	Ready.
Oregon Basin.....	68,000	-----	-----	4,500	6	(²)	Not ready.

¹ These estimates must be considered as merely preliminary and subject to change.

² No estimate.

Irrigable and irrigated acreage.—The statistics of irrigation show that on the projects of the Reclamation Service there are about 500,000 acres of land to which the service is ready to deliver water but which are not irrigated. This immediately raises the query as to why this is so and suggests that further development be delayed. As a matter of fact, such a conclusion would be entirely unwarranted.

The most important item in the acreage not irrigated consists of the unirrigated portions of farms that are occupied and cultivated but have not been wholly brought under cultivation. The reduction of the average farm in the arid region to actual cultivation by the occupier requires clearing, leveling, and ditching, and is a slow process with the average settler, who has limited capital and is probably depending upon his own efforts and his own teams to accomplish results. The facts are that on the average three-fourths of each occupied farm is actually under irrigation, and this is a very good showing under the circumstances. Many old-settled communities have done little better.

The next item of importance is the acreage represented by holdings of nonresidents or of persons owning more than 160 acres and who are unable to purchase water right for the excess holding. The law prohibits the sale of water rights to nonresidents and to holdings greater than 160 acres. Gradually the excess holdings are being disposed of to new settlers, and the nonresidents are either selling to settlers or are themselves gradually occupying the lands and placing them under cultivation.

A third class is composed of the public lands that are open to entry and have not been filed upon. These are comparatively few, are distributed on several of the public-land projects, and are as a rule lands but recently opened to settlement or are of inferior quality, so that while they may be eventually taken this is not done until after the better opportunities are exhausted. Roughly speaking, the area

covered by crop census to which we can deliver water may be divided about as follows:

	Acres.	Per cent.
Occupied farms partly cultivated.....	1,312,000	82
Nonresident and excess holdings.....	240,000	15
Unentered public lands.....	48,000	3

Advantages of irrigation farming.—Agriculture in the arid region where irrigation is feasible has several important advantages over that in the humid region. The soils of the arid region by the nature of the case have generally not been leached of their mineral plant foods as have those in the humid region, and they are therefore much richer in this respect on the average and are seldom or never acid, as are soils in the humid region. This quality has the disadvantage at times of leaving the arid lands charged with hurtful alkalis, which seldom remain in the humid region on account of their solubility, but where the injurious salts do not predominate the general principle of abundance of mineral plant food obtains and constitutes a distinct advantage for the soils of the arid region over those of humid regions.

There is much advantage in being able to apply water to growing crops at just the time and in just the quantity needed, and to withhold it at will. Where the water supply is ample this constitutes a very important advantage in arid regions.

Another striking advantage is the preponderance of clear days in an arid region, where the absence of rainy and cloudy weather affords a much larger percentage of sunshine than is found in humid regions. As sunlight is one of the most important essentials of healthy plant growth, this advantage is quite important.

Results from these advantages.—It appears that the average gross product of agricultural crops on reclamation projects is just about double the average yield from nonirrigated lands in the country at large. The larger product obtainable per acre from irrigated lands justifies and permits a more careful and intensive cultivation, which with a favorable climate and controllable water supply, yields more certain results than the same care in the humid region.

This means that as much product can be obtained from a 40-acre tract under irrigation as from the average 80-acre tract in the humid region. This, of course, requires more labor per acre, but much less labor in proportion to product. It permits and encourages intensive cultivation and smaller holdings and consequent greater centralization of population. The result is that the isolation of country life is to a large extent eliminated as the irrigating farmer will have fully

twice as many neighbors within a given radius as his prototype in the humid region. The social advantages thus obtained react upon the character of the people and of the communities and other conditions characteristic of irrigated regions to a similar effect.

Cooperation with his neighbors is forced upon the irrigator because it is usually impracticable for him to irrigate his land without such cooperation, the feasible irrigation projects usually being in tracts of many thousands of acres, accommodating thousands of families and giving rise to towns, villages, and characteristic civilizations of their own. This condition stimulates the civic conscience and attention to public affairs of common interest so that the local governments that grow up under such conditions are usually of a superior order and controlled by a superior intelligence on the part of the population living thereunder.

Irrigation progress.—During the past year the operations of the Government under the various reclamation laws have continued to develop the resources of the projects undertaken as shown by the gradual increase in the area for which the service can supply water, the increase in areas actually irrigated and cropped, and the increase in the value of crop produced. This progressive increase is shown in the following table, which gives statistics only for those areas covered by crop census, excluding practically all those additional areas which are served from the works of the Reclamation Service under Warren Act contracts and from which crop statistics were not obtainable. It is estimated that, including these areas, the crop value in 1918 amounted to \$100,000,000 or over.

Year.	Irrigable acreage.	Irrigated acreage.	Cropped acreage.	Crop value.
1913.....	1,181,362	694,142	637,227	\$15,676,411
1914.....	1,240,875	761,271	703,424	16,475,517
1915.....	1,330,222	814,906	757,613	18,164,452
1916.....	1,405,452	922,821	858,291	32,815,972
1917.....	1,502,468	1,026,633	966,784	56,462,313
1918.....	1,601,934	1,119,566	1,051,193	66,921,396

The statistics given in the above table do not, however, tell the whole story. The easy terms of repayment granted by the Government and the high prices received for their products have combined with the other favorable conditions and with the industry of the people to produce a condition of prosperity beyond the indications of the bare statistics.

Contracts under Warren Act.

[Act of Feb. 21, 1911, 36 Stat., 925.]

Name of contractor.	Date of contract.	Area in acres.	Amount of water in acre-feet.
BOISE PROJECT, IDAHO.			
Boise, Payette Lumber Co.....	June 15, 1918	100.16	250
Farmers' Cooperative Ditch Co.....	Dec. 3, 1917	15,500	1,000
Farmers' Union Ditch Co.....	Aug. 13, 1917	8,100	2,425
Black Canyon Irrigation District.....	Jan. 2, 1918	39,000	(1)
Nampa & Meridian Irrigation District.....	June 1, 1915	24,557	2,934
New York Canal Co. (Ltd.).....	July 1, 1918	21,498	(2)
Pioneer Irrigation District.....	Feb. 27, 1913	34,400	17,700
Pioneer Irrigation District and Black Canyon Irrigation District.....	May 28, 1919	6,000	43,000
Riverside Irrigation District and Big Bend Irrigation District.....	Feb. 15, 1918	14,385	1,000
Settlers' Irrigation District.....	Feb. 9, 1918	12,000	1,500
Do.....	Feb. 18, 1919	420	(1)
Total.....		175,960.16	
MINIDOKA PROJECT, IDAHO—JACKSON LAKE ENLARGEMENT UNIT.			
Aberdeen-Springfield Canal Co.....	June 4, 1917	65,000	40,000
American Falls Canal Securities Co.....	Dec. 28, 1917	7,000	2,635
Armsberger, J. R.....	June 1, 1918		300
Bradbury, W. A., and J. C. McMullen.....	Apr. 23, 1917	280	200
Burgess Canal & Irrigating Co.....	Mar. 28, 1917	23,000	5,120
Conant Creek Canal Co. (Ltd.).....	Aug. 5, 1918		240
Dewey Canal Co.....	Aug. 4, 1918		240
Enterprise Canal Co. (Ltd.).....	Apr. 15, 1917	7,000	6,100
Enterprise Irrigation District.....	Aug. 2, 1918		2,400
Farmers' Friend Canal Co. (Ltd.).....	Aug. 5, 1918		800
Farmers' Friend Irrigation Co.....	June 18, 1917	10,000	2,000
Farmers' Own Ditch Co. (Ltd.).....	Aug. 2, 1918		240
Harrison Canal & Irrigation Co.....	Apr. 5, 1917	13,000	5,000
Independent Canal Co. (Ltd.).....	Aug. 3, 1918		2,400
Kuhn Irrigation & Canal Co. and Twin Falls Canal Co.....	Feb. 25, 1913	410,000	400,000
Last Chance Canal Co. (Ltd.).....	Aug. 4, 1918		480
Lenroot Canal Co. (Ltd.).....	July 27, 1917	4,000	3,000
Lowder Slough Canal Co. (Ltd.).....	Apr. 15, 1917	1,300	1,040
Lyle, W. S.....	do.....	160	155
Martin Canal Co.....	do.....	1,500	1,500
New Sweden Irrigation District.....	June 29, 1917	27,000	5,000
Poplar Irrigation District.....	May 1, 1917	1,200	1,200
Peoples' Canal & Irrigation Co.....	Apr. 15, 1917	20,000	8,000
Rudy Irrigation Canal Co.....	do.....	8,000	2,000
Snake River Valley Irrigation District.....	Aug. 11, 1917	24,000	15,000
Sunnydell Irrigation District.....	June 8, 1917	4,400	4,000
Total.....		626,840	
NORTH PLATTE PROJECT, NEBRASKA-WYOMING.			
Beerline Irrigation Canal Co.....	July 3, 1918	1,113	1,639
Browns Creek Irrigation District.....	July 14, 1913	7,784	19,900
Central Irrigation District.....	Mar. 6, 1913	1,501	4,050
Chimney Rock Irrigation District.....	do.....	3,916	10,300
Gering Irrigation District.....	Jan. 17, 1913	14,243	35,500
Tri-State Land Co. (Farmers' Irrigation District).....	Aug. 20, 1912	60,000	180,000
Bridgeport Irrigation District.....	June 14, 1915	17,434	37,478
Goshen Land Co. (and Lingle Water Users' Association).....	July 1, 1915	9,800	32,853
Pleasant Valley Lateral Association.....	June 16, 1915	4,000	13,522
Lincoln Land Co.....	Apr. 17, 1917	954	1,941
Dawson County Irrigation Co. ³	Mar. 19, 1919		5,000
Total.....		120,745	
BELLE FOURCHE PROJECT, SOUTH DAKOTA.			
Beyer Aune and Bessie Hull Aune.....	May 2, 1918	36.8	
STRAWBERRY VALLEY PROJECT, UTAH.			
P. E. Whiting.....	June 8, 1916	40	40
John I. Hayes.....	do.....	20	20

¹ Canal capacity $\frac{1}{2}$ inch per acre. ² Indeterminate. ³ Temporary contract for season of 1919 only.

Contracts under Warren Act—Continued.

Name of contractor.	Date of contract.	Area in acres.	Amount of water in acre-feet.
STRAWBERRY VALLEY PROJECT, UTAH—continued.			
William A. Pace.....	Sept. 26, 1916	120	50
Soldier Fork Unit.....	Dec. 15, 1916	130	67.5
Do.....	July 16, 1918	55	55
Clinton Unit.....	June 1, 1915	1,458.41	700.9
Payson City.....	Jan. 8, 1917	(1)	200
Spanish Fork City, No. 1655.....	Apr. 28, 1917	(1)	400
Spanish Fork City, No. 1710.....	Aug. 21, 1918	(1)	40
Springville Irrigation District.....	Dec. 29, 1917	3,000	2,400
Mapleton Irrigation District.....	Jan. 2, 1918	4,000	3,600
Do.....	Apr. 5, 1919	1,000	1,108
Total.....		9,823.41	
YAKIMA PROJECT, WASHINGTON.			
Sunnyside Irrigation District.....	Oct. 6, 1914	4,630	18,520
Snipes Mountain Irrigation District.....	Nov. 16, 1914	1,915	5,266.25
Outlook Irrigation District.....	Nov. 23, 1914	4,225	2,928.50
Union Gap Irrigation District.....	Mar. 2, 1915	1,500	4,275
Grandview Irrigation District.....	Aug. 4, 1916	3,994	10,983.50
Prosser Irrigation District.....	Dec. 1, 1917	2,150	6,450
W. O. Bradbury.....	May 22, 1916	18	54
Taylor & Robar.....	Nov. 24, 1916	30	90
Herbert Bostock.....	July 19, 1917	30	90
C. S. Mead.....	May 23, 1918	50	76
H. L. Stonebraker.....	Nov. 22, 1918	40	120
Total.....		18,582	
Grand total.....		951,987.37	

¹ City lots.

No new projects undertaken.—No new projects have been undertaken within the past year, as there have been no funds available for this purpose. The gradual decline in the receipts from the sales of public lands, due largely to the wholesale disposal of these lands under the operation of the 640-acre homestead act, has naturally greatly restricted the operations under the reclamation act. The small payments provided by law from the irrigated lands have kept the returns from the constructed projects to a low point. It is now necessary, under the provisions of existing law, to set aside \$1,000,000 per annum from these receipts to repay the advances to the reclamation fund which were provided by the act of 1910, known as the "bond loan." It has been possible on this account only slightly to extend the irrigated area by some extension of canal systems and to take care of water-logged conditions on some of the projects.

Seepage and drainage.—The industry of irrigation by which water is applied to the surface of the soil for the growing of crops is necessarily attended by a considerable escape of such water to the subsoil, where in most cases it joins ground water, and this gradually rises. Such a condition is of course aggravated and expedited by wasteful applications of water, and this is very difficult to avoid if the soils are open and porous, but even in case of

tight soils and a reasonably economical use of water some rise of ground water is likely to occur, and very few irrigated regions of magnitude exist in the world which have not attached to them an important drainage problem. Accordingly, during the last few years one of the largest and most important activities of the Reclamation Service has been the provision of suitable drainage works on the various projects where these are required. In some cases these have been practically completed and are serving their purpose well, but in the majority of cases they are still in progress, and the available construction funds are not sufficient to carry this on with the requisite speed and economy. Hence considerable areas which ought to be returning construction charges are held back for this reason, as it is of course impossible to collect the charges from unproductive land.

Reclamation project operations.—The Salt River project in Arizona is being operated by the local organization of water users under a contract by which the Secretary of the Interior turned over the works and the income of the large power plants constructed in connection with the project. It is in a prosperous condition and the income from power a good deal more than pays the construction charges. The Government connection with this project is confined to occasional inspection and supervision, as provided in the contract. The ground water is rising on this project and will require early attention in order to prevent injury to a considerable area of land. This has been investigated by the water users' association, which is alive to the problem and will doubtless take necessary action.

On the Yuma project, Arizona-California, the Yuma Valley, which lies in Arizona, has been placed under public notice, but the payments are being contested by the water users' association. This contest came to trial in the month of April and the case is now held under advisement by the court. The Yuma Valley is exceedingly prosperous, having, with one exception, the highest gross yield per acre of any of the projects of the Reclamation Service. This for the year 1918 was over \$113 per acre, exclusive of live-stock increase. Announcement has been made of the sale of a portion of the lands on the Yuma Mesa, which will be irrigated with water pumped from the main canal south of the city of Yuma under the provisions of a special act of Congress. A contract has been executed with the Imperial irrigation district to connect its system with Laguna Dam and provide better security for its water supply.

The Orland project in California is regarded as the first unit of a comprehensive project for the development of the Sacramento Valley. It, however, stands as a self-supporting project, with an ample water supply from Stony Creek, a tributary of Sacramento

River, and has been practically completed. Public notice on this project was issued in 1916 and all payments are made promptly when they fall due by the association as a whole. Thus all the annoyance, expense, and risk of delinquency are voluntarily shouldered by the water users' association, which has shown a commendable spirit of cooperation from the first. The project is prosperous and constantly growing in development. The only construction work in progress is a small amount of permanent canal lining, which was provided for in the current public notice, and which is necessary for checking the seepage from the canals constructed in coarse material.

The Grand Valley project in Colorado is delivering water to a portion of the land which has been opened to entry and occupied by settlers. The agricultural operations are gradually extending and results are encouraging. The physical conditions in this valley are difficult on account of the seamy shale which occurs on the canal system and which has required a large amount of maintenance and betterment work to render the canals tight. Aside from these difficulties, the works are operating in a very satisfactory manner.

The Uncompahgre project, Colorado, is being operated by the United States under contract with the Water Users' Association upon the payment of the cost of such operation by the association. The contract provides that the operation may be turned over to the Water Users' Association whenever they so elect, and this is being consummated. The existing contract provides for the operation and cost for a period of five years, at the end of which period the project is to be opened under public notice unless further extension is made by the Secretary of the Interior. At that time, according to the contract, the construction repayments will begin. The construction of the project is completed, so far as the plans of the Government have been made, but the distribution systems, which remain in the hands of the irrigators, are very unsatisfactory and should be enlarged and improved. The cultivation of the lands is gradually extending and slow improvement is being made in the use of water which is very wastefully applied to the lands. Efforts are being made to introduce the rotation system and to charge for water on an acre-foot basis, which will be necessary before good practice in the economy of water can be hoped for. The excessive application of water is manifested by a rising water table and the destruction of the fertility of some of the land. Agriculture in general is successful, and the settlers are prosperous.

The Boise project in Idaho includes the Arrowrock and Deer Flat Reservoirs, which have been completed, and a canal system which now delivers water to the main body of the project. Contemplated extensions will be made gradually to conform to better practices regarding the use of water which is sufficient for irrigating about

40,000 additional acres of land if used with reasonable economy. Public notice was issued in 1917 announcing the charges on the completed portion of the project, but the water users brought suit to escape a portion of the repayment, and this has been tried in the United States court. A preliminary opinion has been handed down by the court which holds that the full cost of the project must be paid by the beneficiaries but withholds decision upon several points of detail.

In addition to the main project, the United States, under 11 special contracts, delivers storage water to about 150,000 acres of lands that are served by independent systems. The current year has been one of exceptional drought, and it was preceded also by a very dry year. It is the general opinion, as expressed by the water users and the local press, that the benefits of the past season from the storage works constructed by the Government have been greater than the total cost of those works in the increased product upon the lands served by stored water, which would have been without water except for these works. The project as a whole is very productive and successful.

The Minidoka project in Idaho as originally planned has been completed, but several extensions are possible and desirable. The project is in two portions: That which is served with irrigation water by gravity has been formed into an irrigation district which operates the canal system serving it under contract with the United States; the pumping unit on the south side of the river is operated by the United States. The results of irrigation in this region are very striking and exceptionally successful.

The Huntley project in Montana is practically completed, and is one of the most successful and thickly settled projects of the service. Drainage work is in progress, and some enlargement of a portion of the delivery system is also being made. Construction payments upon the lands served are being regularly made.

In the Milk River Valley, Mont., water is being delivered through a canal leading from St. Mary River, which diverts that river just below St. Mary Lake. By a treaty arrangement with Canada the waters of the St. Mary are divided on an agreed basis and this water is being used very completely the present year. The demand for irrigation water, on account of the excessive dryness, is greater than ever before. The water is all used on a rental basis, partly through the works of the service and partly delivered to canal systems of private or cooperative companies.

On the Sun River project, Montana, the original unit on the south side of Sun River is being operated as usual. On the north side of the river where many of the settlers were attempting to secure title to their homesteads without the liability for irrigation water, which

is included in their filing papers, a series of three dry years in succession has shown that dry farming is not profitable and has revived the demand for irrigation water. Difficulties with the canal systems have been encountered on account of the unfavorable material with which they were constructed, but it is possible this year to deliver water to about 25,000 acres, and a considerable portion of this is being served on a rental basis. A beet-sugar factory would be profitable in this region.

The Lower Yellowstone project in Montana and North Dakota has been operated for years on a rental basis with only a small fraction of the lands irrigated. The neighboring lands have been for years farmed without irrigation, and though the returns from dry farming have always been less than under irrigation, the temptation to avoid the expense of water service has been so great that the project has not yet been placed on a paying basis. A series of dry years, however, has increased the demand for water and steps have been taken to form an irrigation district and arrange for permanent water rights for the lands to be included. Appropriate laws have been passed by both States, and the prospect is good for the success of the project. The demand for water on this project has been more than twice as great this year as in any previous year, and good crops are reported. The project offers favorable conditions for the location of a beet-sugar factory.

The North Platte project in Nebraska and Wyoming is one of the largest as well as one of the most successful of the reclamation projects. The Interstate unit on the north side of the river, most of which is under public notice, is largely under cultivation, and improvement is steadily extending. Drainage is being constructed, and considerable areas are yet to be relieved. On the south side of the river the main or Fort Laramie Canal and its lateral system are under construction, and water is being delivered under rental contracts. This is the region of most rapid development of anything in the service.

The Newlands (formerly the Truckee-Carson) project in Nevada is held back for two reasons. A drainage system is needed, and though some preparations have been made toward organizing a district to secure payment for this work, the State laws are not favorable, and this has not yet been successful. The other handicap is the lack of storage for the lands on the upper part of the system, but legal and other obstacles have been thrown in the way of a proper regulation of Lake Tahoe, the only available reservoir site of consequence which can serve this region. The main canals for using water have been built, but storage works are still necessary. Pending their development no further extension is feasible.

The Carlsbad project in New Mexico is gradually increasing its cultivated area, and is in a prosperous condition. Some drainage is still to be accomplished, but the water supply is ample, and results are satisfactory.

The Rio Grande project in New Mexico and Texas is being operated on a rental basis. Nearly one-half of the land is in cultivation, and is being served by storage water from the Elephant Butte Reservoir. The flat topography of the valley, the peculiar fineness of the soil, and the very wasteful use of water in the past have brought up the water table over most of the valley, and much of the land has been injured. An extensive drainage system is being installed, and is successful so far as constructed. Its prosecution, however, is greatly hampered by the lack of sufficient funds. The lateral system which has been operated for many years by the local association of irrigators is very inadequate and inefficient, and the water is wastefully used. At the instance of the water users the various works are being gradually turned over to the Government, and are being rebuilt and put in shape for efficient service. This will to some extent remedy the threatening condition of the rising water table, and is necessary for the success of the drainage system planned. The progress along this line has been successful so far, but not very extensive.

The North Dakota pumping project, which has not been operated for several years owing to failure of the lands benefited to make payment therefor, has been formed into an irrigation district and a contract made with the Secretary of the Interior assuring its operation and the payment for the cost thereof. It is being operated this year and good results are expected.

The Umatilla project in Oregon has always been bothered by drifting sand, and in some restricted localities by an extremely coarse subsoil which allows the rapid escape of irrigation water and the leaching of soil. These difficulties are being overcome to some extent and progress in cultivation is steady and encouraging. Urgent requests have been made for the Government to enlarge the project by taking over some of the private canals which have insufficient water supply and constructing a reservoir to serve them. This can not be undertaken without additional funds.

The Klamath project in Oregon and California is being gradually extended as the waters of Tule Lake recede owing to the diversion of the supply through the Government works. Drainage works are in progress and have been successful so far as constructed. Legislation is pending to permit the reclamation of the lands around lower Tule Lake, but has not yet passed. The project can not be successfully developed without this additional legislation. The irrigated land, however, is productive and the settlers generally prosperous.

The Belle Fourche project in South Dakota is growing in production and prosperity. It is a favorable location for a beet-sugar factory. In some localities the water table is rising and drainage works should be installed, but arrangements have not yet been made for the repayment of the cost. A small amount of the land under the feed canal and not served from the Owl Creek Reservoir suffers from water shortage in some years, and plans are under way for providing a small storage reservoir to serve these lands.

On the Strawberry Valley project in Utah the principal work constructed by the Government is a storage reservoir in Strawberry Valley on the head waters of the Duchesne River and the diversion of its waters through a long tunnel to the westward slope of the Wasatch range where the water is diverted from the Spanish Fork River and an irrigation system constructed. This system is being operated by the irrigators under special contract and payments of construction charges are being regularly made. In many instances canal systems already in existence are being operated by associations which have made arrangements for storage water from the Strawberry Valley Reservoir and are operating their own canal systems. There are still some water rights in the Strawberry Reservoir for sale.

Three extremely dry years—1917, 1918, and 1919—throughout a large portion of the West have broken all records for drought, and thousands of live stock and many private irrigation projects have suffered for lack of water. Dry farming has generally been a failure throughout these regions.

The Reclamation Service experienced serious water shortage on one project—the Okanogan project in northern Washington in 1918, and while there was some shortage also in 1919 it was not so great. Pumping plants were installed at Salmon Lake and Duck Lake to supplement the storage reservoirs which did not entirely fill. The additional pumping capacity and the enlargement of the reservoir hold-over capacity are the remedies being carried out.

The Yakima project in Washington includes a large system of storage reservoirs and two canal systems known as the Sunnyside unit and the Tieton unit. The project as a whole is very productive and prosperous and strong pressure is being made to secure the construction of more storage, the extension of existing canal systems, and the construction of new canals from the Yakima River and its tributaries. The excellent results obtained show that this would be a wise development. The Yakima project as a whole is one of the foremost in general prosperity and in returning the cost of this construction.

The Shoshone project in Wyoming is being gradually extended by additions to the canal and lateral systems on the north side of the

Shoshone River. The drainage system, which has been largely completed and has been very successful, is also being extended under contract with the water users in accordance with law. The lands are very productive and the project very prosperous. Preparations are being made for the construction of an additional unit on the south side of the Shoshone River for which ample storage capacity has been provided in the Shoshone Reservoir.

The value of the agricultural products exclusive of live stock produced by the Government reclamation projects during the season of 1918, amounting to nearly \$67,000,000, has been over half of the net cost of construction of all of the projects during the last 17 years. On some of the projects the 1918 production has exceeded the total construction cost, and even better results are anticipated for the current agricultural year. The results in the extension of agriculture and of home making have justified the expectations of the advocates of this activity and argue strongly for its extension, for which there is great and growing demand.

Summary of construction results.—The following table gives a concise view of the work accomplished during the fiscal year and to date:

Summary of construction results, June 30, 1919.

Items.	To June 30, 1919.		To June 30, 1918.		Increase.	
	<i>Acres.</i>	<i>Farms.</i>	<i>Acres.</i>	<i>Farms.</i>	<i>Acres.</i>	<i>Farms.</i>
Lands:						
Estimated area of projects on completion.....	3,212,008	67,447	3,081,480	62,477	130,528	4,970
Reservoir capacity available (original).....	<i>Acre-feet.</i> 9,430,910		<i>Acre-feet.</i> 9,197,460		<i>Acre-feet.</i> 233,450	
Canals, ditches, and drains:						
Canals over 800 second-foot capacity.....	<i>Miles.</i> 438		<i>Miles.</i> 420		<i>Miles.</i> 18	
Canals 301 to 800 second-foot capacity.....	670		667		3	
Canals 50 to 300 second-foot capacity.....	1,919		1,807		112	
Canals less than 50 second-foot capacity.....	7,807		7,544		263	
Total canals.....	10,834		10,438		396	
Waste-water ditches.....	665		495		170	
Drains, open.....	643		643			
Drains, closed.....	172		163		9	
Total.....	1,480		1,301		179	
Grand total.....	12,314		11,739		575	
Tunnels.....	<i>Number.</i> 95	<i>Length (ft.)</i> 143,847	<i>Number.</i> 94	<i>Length (ft.)</i> 142,237	<i>Number.</i> 1	<i>Length (ft.)</i> 1,610
Storage and diversion dams:	<i>Cubic yards.</i>		<i>Cubic yards.</i>		<i>Cubic yards.</i>	
Masonry.....	2,087,991		2,084,187		3,804	
Earth.....	10,220,671		9,998,351		222,320	
Rockfill and crib.....	1,203,386		1,185,529		17,857	
Total.....	13,512,048		13,265,067		243,981	
Dikes and levees.....	<i>Length (ft.)</i> 513,989	<i>Cu. yds.</i> 4,517,664	<i>Length (ft.)</i> 504,426	<i>Cu. yds.</i> 4,470,702	<i>Length (ft.)</i> 9,563	<i>Cu. yds.</i> 46,962

Summary of construction results, June 30, 1919—Continued.

Items.	To June 30, 1919.		To June 30, 1918.		Increase.	
Canal structures:	<i>Concrete.</i>	<i>Wood.</i>	<i>Concrete.</i>	<i>Wood.</i>	<i>Concrete.</i>	<i>Wood.</i>
Costing over \$2,000.....	1,044	201	958	184	86	17
Costing \$500 to \$2,000.....	2,100	528	2,011	478	89	50
Costing \$100 to \$500.....	9,896	5,870	9,177	5,011	719	859
Costing less than \$100.....	19,682	57,824	16,386	55,003	3,296	2,821
Total.....	32,722	64,423	28,532	60,676	4,190	3,747
Grand total.....	97,145		89,208		7,937	
Bridges:	<i>Number.</i>	<i>Length (ft.)</i>	<i>Number.</i>	<i>Length (ft.)</i>	<i>Number.</i>	<i>Length (ft.)</i>
Steel.....	106	8,579	105	8,466	1	113
Combination.....	414	12,542	414	12,542	.....	.....
Wood.....	6,134	135,218	5,500	117,606	634	17,612
Concrete.....	346	4,399	342	4,254	4	145
Total.....	7,000	160,738	6,361	142,868	639	17,870
Culverts:						
Concrete.....	1,330	95,088	1,832	88,719	98	6,369
Metal.....	1,560	54,929	1,433	52,005	127	2,924
Terra cotta.....	1,505	64,096	1,096	50,947	409	13,149
Wood.....	4,049	96,492	3,164	72,213	885	24,279
Total.....	9,044	310,605	7,525	263,884	1,519	46,721
Pipe:	<i>Linear feet.</i>		<i>Linear feet.</i>		<i>Linear feet.</i>	
Concrete.....	628,572		596,250		32,322	
Metal.....	247,136		239,616		7,520	
Terra cotta (tile).....	1,270,375		1,166,337		104,038	
Wood.....	495,432		471,236		24,196	
Total.....	2,641,515		2,473,439		168,076	
Flumes:	<i>Number.</i>	<i>Length (feet).</i>	<i>Number.</i>	<i>Length (feet).</i>	<i>Number.</i>	<i>Length (feet).</i>
Concrete.....	85	27,658	80	20,427	5	7,231
Metal.....	960	159,072	755	150,799	205	8,273
Wood.....	2,141	449,569	1,928	433,947	213	15,622
Total.....	3,186	636,299	2,763	605,173	423	31,126
Canals lined:	<i>Concrete.</i>	<i>Wood.</i>	<i>Concrete.</i>	<i>Wood.</i>	<i>Concrete.</i>	<i>Wood.</i>
Length.....miles..	307.57	4.10	307.30	4.10	.27	.....
Total.....	311.67		311.40		.27	
Buildings:	<i>Number.</i>		<i>Number.</i>		<i>Number.</i>	
Offices.....	97		83		14	
Residences.....	636		590		46	
Power plants.....	29		26		3	
Pumping stations.....	89		69		20	
Barns, storehouses, etc.....	523		495		28	
Total.....	1,374		1,263		111	
Wells.....	<i>Number.</i>	<i>Depth (feet).</i>	<i>Number.</i>	<i>Depth (feet).</i>	<i>Number.</i>	<i>Depth (feet).</i>
	448	47,879	416	35,411	32	12,468
Communications:	<i>Miles.</i>		<i>Miles.</i>		<i>Miles.</i>	
Roads.....	970		955		15	
Railroads.....	83		83		---	
Telephone lines.....	3,126		2,934		192	
Transmission lines.....	615		450		165	
Total.....	4,794		4,422		372	
Power developed, water and steam..	<i>Horsepower.</i>		<i>Horsepower.</i>		<i>Horsepower.</i>	
	59,633		48,093		11,540	
Excavation:	<i>Cubic yards.</i>		<i>Cubic yards.</i>		<i>Cubic yards.</i>	
Class 1, earth.....	154,473	487	141,015	518	13,457	969
Class 2, indurated material.....	9,913,065		9,569,457		343,608	
Class 3, rock.....	8,409,722		8,199,793		209,929	
Total.....	172,796,274		158,784,768		14,011,506	
Riprap.....cubic yards..	1,892,728		1,735,893		156,835	
Paving.....square yards..	819,408		807,485		11,923	
Concrete.....cubic yards..	3,023,446		2,976,448		46,998	
Cement.....barrels..	2,971,330		2,919,107		52,223	

Settlement.—Owing to the improved financial condition of the project farmers, due to good crops and war prices, public interest in Government irrigated lands has become very keen, and the inquiries concerning future public openings showed a marked increase during the year. The widespread hunger for irrigated Government land was shown by the number of inquiries which followed the announcement of an opening of 16 farms on the Yuma project. More than a thousand letters were received, nearly every State in the Union being represented. It was necessary to hold a drawing for every one of the farms, as 724 applicants were present at the opening.

Two small land openings occurred during the year—Newlands project, 11 farms; Yuma project, 16 farms. On June 30, 1918, there were 295 unentered farm units on all the reclamation projects. On June 30, 1919, there were 133 unentered farms. During the year there were added 27 units, so that the total number of farm units entered that year was 189. The remaining unentered farms represent the poorest tracts in the projects. Many are seeped and must be drained; others are rough or badly cut by canals and ditches.

The past year was the most active in the history of the service in the transfer of private lands on the projects. The sales by original owners in whole or in part of their ranches amounted to millions of dollars, and prices of land which a few years ago was desert and worthless ranged from \$100 to \$1,000 per acre. In these transfers it was noted that many of the purchasers were from other projects whereon they had been successful, and the change was made usually by reason of a desire for a milder climate. Montana farmers have sold at good prices to Mississippi Valley farmers and have transferred to Idaho and Oregon, while the Idaho farmer has joined the numbers thronging to California. With plenty of money and experience the newcomers are valuable additions to the communities in which they locate.

Land values are constantly rising on all the projects. A notable example of this is shown in the sale of State and school lands on the Belle Fourche project last April. The lands offered, 2,124 acres, were listed for sale three years ago with no purchasers, although the prices were very reasonable and the terms most generous. In the April sale every acre was sold and the competition was so keen that the prices in every case were above the minimum set by the State. Lands which in 1916 found no bidders at \$12 to \$20 per acre sold quickly for \$20 to \$50, the purchaser in each instance assuming an obligation to pay \$60 per acre to the Government for a water right.

The demand of the soldiers for opportunities to acquire land overshadows everything in connection with settlement work, but it will

not be a wise policy to overlook the very urgent and increasing call for similar opportunities from citizens who were unable to wear the colors. Every consideration of good policy that can be advanced stresses the need of increasing greatly the acreage for settlers on all public-land projects as well as the taking up of new projects without delay. Neglect and long deferment of definite plans for rapid land development may still this hunger.

Including areas under Warren-Act contracts, served from Government works, the national reclamation policy has resulted in an annual crop production of \$100,000,000 or over from lands which a short time ago returned nothing. To it must be attributed also the establishment of more than 200,000 people in prosperous and contented homes on the land and an equal number in the cities, towns, and villages which are the result of this agricultural development. The progress being made by these communities equals that of the most prosperous regions of our country. With millions of acres of equally favorable land awaiting development and thousands of citizens clamoring for farms, it is most important that a liberal policy in providing funds to construct the necessary works should be followed by Congress.

During the coming year land openings will occur on the North Platte and Shoshone projects, and a few additional farms will be available on the Newlands project. In December, 1919, 6,000 acres of land on the Yuma Mesa will be sold at auction. The funds derived from the sale are to be used in constructing a power and pumping plant and the distribution system. These lands are described as being practically frostless and peculiarly adapted to the production of citrus fruits.

Are project settlers permanent?—In order to determine to what degree settlement on reclamation projects is permanent, an investigation was made of a number of representative projects.

Five of the projects selected for investigation, namely, Huntley, Minidoka, North Platte, Shoshone, and Umatilla, were thought to have experienced unusually trying conditions for the settlers, and one, Boise, was thought to have been quite favorable. Letters were sent to the project managers of these six projects asking the number of original settlers still in possession and the number of transfers made by other settlers, together with any proper explanations.

Although the figures are probably not infallible, they are as nearly correct as possible. The margin of error is doubtless small in any case. The chance for greatest variation is in the number given for total farm units, because these are constantly changing and subdividing.

One of the projects, Minidoka, was also checked up by consulting the tract books in the General Land Office in Washington.

Following is a tabulation from the reports received:

Project.	Settlers still in possession, or who have satisfied homestead requirements.	Total number of settlers.	Per cent of total.	Total number of farm units.	Number of settlers per farm unit.
Boise, Idaho.....	987	1,273	89.1	1,107	1.14
Huntley, Mont.....	383	839	65.0	589	1.42
Minidoka, Idaho.....	899	2,709	55.8	1,609	1.68
North Platte, Nebr.-Wyo.....	723	2,155	54.0	1,337	1.61
Shoshone, Wyo.....	405	902	66.5	609	1.48
Umatilla, Oreg.....	136	289	69.3	196	1.47
Total.....	3,533	8,167	65.2	5,447	1.49

From the figures quoted it is computed that the average number of settlers to a farm unit on the Boise project, where conditions were favorable, was 1.14, or slightly more than 1—truly a remarkable showing when it is considered that farms in general often go through many changes in ownership—and only 1.68 on the Minidoka project, where conditions were adverse.

Opponents to homestead and reclamation acts have argued that settlers take up their farms merely for speculation. Although no effort has been made to learn the changes on reclamation projects after title has been obtained, results indicate slight changes during the time of proving up.

Before the end of the period required for residence, settlers may relinquish their right and for money consideration pass on the farm unit. This can safely be done only when the relinquishment paper is filed simultaneously with another entry. Any such transaction may come under the notice of the project office if the settlers are known personally. Giving up an entry does not by any means indicate that the entryman has failed to make good on his farm. It may show quite the contrary—that he has succeeded so well that he is able to sell out his improved farm for a good figure. This kind of speculation can hardly be avoided.

The first few years of the Reclamation Service were the most severe for the project settlers. Water was not available at this time, and under the law settlers could not be prevented from taking up land which might not receive water for years. Having seen how often it worked hardship for settlers to struggle along until water was ready, the service secured the passage of a law which prohibited the entering of farm units until the irrigating system is in operation, resulting unquestionably in even greater permanence of settlers on projects opened under these conditions.

The investigation has shown conclusively in connection with Federal projects that there is not the slightest basis for the statement so often and so loosely made that “throughout the newer parts of America at least three settlers in succession attempt to develop a farm before one succeeds.”

Irrigation and crop results, 1918.—The usual census of irrigation and crop results on the Government reclamation projects, as described in previous annual reports, was continued during the period covered by the present report. Obviously such information is not adapted to fiscal years, and the figures that follow are for the last growing season or calendar year, that of 1918. On the Salt River project, Arizona, where some crop is growing at all times of the year, a convenient period is taken as the agricultural year, from October 1 to September 30, which date approximately marks the transition from the heavy summer production to the winter crops. On that project operation and maintenance of the works built by the Government have been turned over to the Salt River Valley Water User's Association, and in the following statistics of crop production the figures for that project are gathered and furnished by the association. Similarly on the gravity unit of the Minidoka project, Idaho, the Minidoka irrigation district handles the operation and maintenance and has compiled the crop data. On the King Hill project, in the same State, the data are furnished by the King Hill irrigation district. The poor showing on this project is due to the bad condition of the canal system, which was built under private auspices. The United States has undertaken its reconstruction, and this work is under way, but not sufficiently advanced to insure a good water supply to the bulk of the project. The Government has not undertaken operation and maintenance on this project, which are handled by the district.

It will be noted that these reports do not give the total value of farm products in that they include nothing from farm animals. The project census does not cover the income from livestock or stock products, but it is known that large additional returns are realized from sales of animals, poultry, dairy products, wool, and honey.

It should also be noted that the crop reports by no means cover the entire area to which water is made available and delivered from the works built by the Reclamation Service. In general these statistics are limited to those areas for which the United States has built a complete system from the point of storage or diversion to the laterals serving each farm and where the Government is operating such works, thus employing a force of ditch riders in frequent touch with the irrigators. This provides a ready means of gathering census data of more than ordinary accuracy and at little or no extra expense, since the time for collecting these coincides with that when the water deliveries are dwindling in the fall and the ditch riders, while still required for occasional deliveries, have less onerous duties in connection with the operation and protection of the system.

In addition to the tracts covered by the crop reports, there is a large and growing area dependent in various degrees on the Government works for water supply through special contracts, mainly

under the Warren Act, calling for delivery of water in bulk from the reservoirs, or at various stages of distribution to the land. This large area is not covered by the crop reports nor included in the following statistics though comparable in the aggregate to the area thus reported. The following tabulations, therefore, are merely summaries of the crop reports obtained and are so entitled; they fail to give, possibly by 50 per cent, the total production made possible by the works built under the reclamation law.

Summary of 1918 crop reports, by projects.¹

State and project.	Irrigable acreage. ²	Irrigated acreage.	Cropped acreage. ³	Crop value.	
				Total.	Per acre.
Arizona, Salt River.....	4 212,960	5 205,616	184,432	\$18,188,800	\$98.70
Arizona-California, Yuma.....	73,000	45,670	45,049	5,105,132	113.32
California-Orland.....	20,533	14,764	12,075	709,172	58.73
Colorado:					
Grand Valley.....	35,000	8,102	6,387	414,310	64.87
Uncompahgre.....	100,000	58,270	57,310	3,302,460	57.62
Idaho:					
Boise.....	6 274,220	6 117,024			
Covered by census.....	143,780	95,074	90,720	5,154,646	56.80
King Hill ⁷	14,500	1,849	1,677	45,588	27.18
Minidoka.....	121,392	105,061	98,182	5,168,078	52.64
Montana:					
Huntley.....	31,360	19,262	19,262	750,963	39.00
Milk River ⁸	58,000	24,843	23,800	408,716	17.17
Sun River ⁹	14,978	7,569	7,832	245,852	31.39
Montana-North Dakota, Lower Yellowstone ¹⁰	42,232	21,075	21,000	669,191	31.85
Nebraska-Wyoming:					
North Platte:					
Interstate unit.....		88,771	85,308	3,100,710	36.35
N. P. C. & C. Co. lands.....	129,778	9,137	9,137	313,064	34.26
Fort Laramie ¹¹	12,132	4,865	4,865	61,815	11 12.71
Nevada, Newlands.....	71,817	42,511	41,490	1,626,142	13 53.15
New Mexico, Carlsbad.....	24,990	19,460	18,200	1,105,515	60.74
New Mexico-Texas, Rio Grande.....	92,300	64,781	64,002	4,237,020	66.20
Oregon-Umatilla.....	24,658	9,100	6,819	400,642	58.75
Oregon-California, Klamath.....	50,000	33,268	32,127	929,131	28.92
South Dakota-Belle Fourche.....	82,592	52,445	52,445	1,276,115	24.36
Utah, Strawberry Valley.....	50,000	32,539	29,788	1,642,327	55.13
Washington, Okanogan.....	10,099	6,402	5,287	749,982	141.85
Yakima:					
Sunnyside unit.....	98,537	84,650	70,465	7,213,392	102.36
Tieton unit.....	32,000	26,400	25,845	2,516,251	97.36
Wyoming-Shoshone:					
Garland unit.....		33,552	32,960	1,370,660	41.59
Frannie unit ¹¹	55,296	4,730	4,729	115,722	11 24.47
Total.....	1,732,374	1,141,516			
Covered by census.....	1,601,934	1,119,566	1,051,193	66,821,396	63.60

¹ Excluding substantial areas (private canals) to which water is furnished under the Warren Act. Data are for calendar year (irrigation season) except on Salt River project data are for corresponding "agricultural year," October, 1917, to November, 1918.

² Area Reclamation Service was prepared to supply water.

³ Irrigated crops. Excludes small areas on few projects cropped by dry farming.

⁴ Includes so-called "dry lands" given right to rent water temporarily on account of ample storage.

⁵ Includes about 5,000 acres within town sites, about 11,000 acres reported "vacant" and probably largely pastured, and over 5,000 acres of "home tracts" including house lots, etc.

⁶ Irrigable acreage includes New York Canal, Nampa-Meridian, and Pioneer district lands served project water. Irrigated acreage here reported is limited to area served full water supply, excluding vested right lands given partial service.

⁷ Poor results on this project are due to condition of canal system, which was built under private auspices. The United States has undertaken its reconstruction; operation and maintenance are handled by the settlers through an irrigation district.

⁸ Crop reports covered an additional area of 3,119 acres cropped by dry farming, producing crops worth \$21,619, or \$6.93 per acre.

⁹ Above figures are for 187 irrigated farms, which included small tracts farmed without irrigation. In addition, crop reports covered 7 farms operated without irrigation, on which 109 acres yielded crops worth \$1,998 or \$18.33 per acre.

¹⁰ Crop report covered an additional area of 5,345 acres dry-farmed, producing crops worth \$60,886, or \$11.39 per acre.

¹¹ New lands, first year of irrigation.

¹² For crops in full production, excluding 9,662 acres of wild-grass pasture and 3,081 acres otherwise in full production. For all crops, \$39.30.

However, a summary of the crop reports received gives some impressive figures of the values that have been secured from the desert lands by the provision of irrigation water. The following table summarizes the reports by projects, and it will be noticed that for several of these the crop values produced average over \$100 per acre. These averages are for all farms and all crops in the large tracts covered by the census, including the least successful with the most successful irrigators, and averaging with banner crops those of low yield or any of entire failure due to pests or other causes. The average returns per acre therefore are an index for a large area in each case, and far greater results are secured by many of the most skilled and successful settlers.

For all projects the crop reports show a gross value of over \$66,000,000, or an average of \$63.60 for each of the 1,050,000 acres cropped. These reports covered an irrigated acreage of 1,119,000 and 1,600,000 acres that were irrigable, i. e., for which the works were ready to supply water. This does not, however, indicate a failure to utilize 500,000 acres and the water ready for it as shown in the preceding discussion.

For the Salt River project, Arizona, the Water Users' Association reported a total crop value of over \$18,000,000. Under the contract by which the association assumed the operation and maintenance of the works and agreed to reimburse the United States for their construction, the amount fixed for the latter purpose is approximately \$10,279,000. Thus the crop value in a single year is more than 150 per cent of the construction cost the association is to repay to the United States over a period of 20 years, and most of which will be supplied by power profits from the project works.

On some of the other projects the development has reached the stage where the annual crop value is comparable to the total cost of building the irrigation works. The Minidoka project, Idaho, which cost about \$5,700,000, yielded crops in 1918 worth \$5,160,000. Prior to the Government work the project was entirely sagebrush desert. The Yakima project, Washington, costing to date about \$10,000,000, yielded crops worth \$9,733,000 in 1918.

In the following table the crop reports are summarized by crops and comparison with similar tabulations for previous years shows relatively small changes in the general character and relative importance of the crops grown. Alfalfa continues as the great basic crop, occupying 40 per cent of the crop area and furnishing one-third of the total crop value. Wheat advanced from 12 per cent in 1917 to 16 per cent of total crop area reported in 1918. The acreage in cotton on the southwestern projects doubled. Eight million bushels of

grain, a like amount of vegetables and truck, 165,000,000 pounds of fruit, and 267,000 tons of sugar beets were harvested from the lands covered by the crop reports. But over half the crop area was devoted to hay and forage crops, largely converted to animal products by feeding on the projects.

Summary of crop reports on reclamation projects in 1918.

Crop.	Acreage cropped.		Yields.			Crop value.		
	Total.	Per cent.	Unit.	Total.	Average per acre.	Average per acre.	Total.	Per cent.
Cereals:								
Barley.....	29,698	2.8	Bushel....	876,070	29	\$36.20	\$1,074,768	1.6
Corn.....	34,944	3.3	do.....	1,017,090	29	48.50	1,674,496	2.5
Oats.....	46,951	4.5	do.....	1,300,410	28	25.00	1,176,413	1.8
Rye.....	1,942	.2	do.....	20,010	10	15.30	29,741	.....
Wheat.....	166,138	15.8	do.....	3,708,170	22	43.10	7,164,646	10.7
Total.....	279,673	26.6	do.....	6,921,850	25	39.60	11,120,064	16.6
Other grain and seed:								
Alfalfa seed.....	9,231	.9	do.....	41,100	4.5	54.50	502,796	.8
Clover seed.....	8,884	.8	do.....	35,060	4.0	71.00	630,855	1.0
Grain sorghum.....	27,326	2.6	do.....	1,028,040	38	64.40	1,759,718	2.6
Flax seed.....	1,710	.2	do.....	10,330	6	19.80	33,920	.....
Millet seed.....	642	.....	do.....	15,840	25	24.90	15,975	.....
Total.....	47,793	4.5	do.....	1,130,370	.....	61.60	2,943,264	4.4
Hay and forage:								
Alfalfa hay.....	419,612	39.9	Ton.....	1,318,780	3.1	54.10	22,720,050	34.0
Clover hay.....	7,290	.7	do.....	14,500	2.0	25.30	184,455	.3
Other hay.....	30,340	2.9	do.....	42,250	1.4	25.40	767,385	1.1
Corn fodder.....	5,234	.5	do.....	18,110	3.5	24.50	127,864	.2
Peas.....	308	.....	Bushel....	4,830	16	38.80	11,960	.....
Other forage.....	3,779	.4	Ton.....	25,680	7	56.80	214,751	.4
Pasture.....	113,637	10.8	.....	.....	.....	15.20	1,730,959	2.6
Total.....	580,200	55.2	.....	.....	.....	44.40	25,757,454	38.6
Vegetables and truck:								
Beans.....	10,711	1.0	Bushel....	141,150	14	54.30	581,642	.9
Onions.....	407	.....	do.....	98,660	242	163	66,361	.1
Potatoes, white.....	28,332	2.7	do.....	4,484,370	158	133	3,775,503	5.7
Potatoes, sweet.....	209	.....	do.....	18,920	91	105	21,938	.....
Truck.....	11,635	1.1	.....	.....	.....	146	1,701,289	2.5
Total.....	51,294	4.9	.....	.....	.....	120	6,146,733	9.2
Fruits and nuts:								
Apples.....	26,121	2.5	Pound.....	97,299,240	3,725	107	2,809,129	4.2
Peaches.....	1,995	.2	do.....	6,612,480	3,310	110	219,229	.3
Pears.....	3,449	.3	do.....	21,265,500	6,160	194	668,956	1.0
Prunes.....	633	.1	do.....	3,512,430	5,550	255	161,071	.2
Citrus fruits.....	2,151	.2	do.....	13,571,160	6,310	253	544,946	.8
Small fruit.....	987	.1	do.....	1,803,590	1,830	203	200,978	.3
Miscellaneous.....	2,643	.2	do.....	21,778,320	8,240	272	718,958	1.1
Total.....	37,979	3.6	do.....	165,842,720	4,365	140	5,323,267	7.9
Miscellaneous:								
Sugar beets.....	27,133	2.6	Ton.....	267,130	9.9	101	2,731,871	4.1
Cotton.....	86,470	8.2	Pound.....	60,412,540	700	141	12,193,480	18.3
Cane.....	4,300	.4	do.....	18,980	4.4	66.60	286,340	.4
Other crops.....	16,826	1.6	Ton.....	.....	.....	18.90	318,952	.5
Total.....	134,729	12.8	.....	.....	.....	115	15,530,643	23.3
Duplication.....	80,475	7.6	.....	.....	.....	.....	.....	.....
All crops.....	1,051,193	100.0	.....	.....	.....	63.60	66,821,396	100.0

¹ This figure does not represent average value of pasture for a year or season, as considerable areas pastured were also harvested and are included in the duplicate area.

BUREAU OF MINES.

Purpose of the Bureau of Mines.—Established by Congress (37 Stat., 681) in 1910 for the purpose of conducting scientific and technologic investigations concerning mining and the preparation and utilization of mineral substances, with a view to the increase of health, safety, and efficiency in the mineral industries, the Bureau of Mines is studying mine gases, rescue, and first-aid training for miners, the utilization of coal and other fuels with greater efficiency, the development of ways to use domestic minerals in place of minerals formerly imported, the prevention of waste in the production, transportation, and utilization of petroleum and natural gas, and the development of processes and methods whereby deposits of minerals now unworked may become available as sources of supply. In addition the bureau during the fiscal year conducted special investigations relating to new methods of producing various substances, administered the provisions of the law controlling the manufacture, sale, possession, and use of explosives during the war, and gathered and disseminated information in regard to sources of supply of economic minerals throughout the world, the political control of these minerals, and the variations in demand at the principal markets from month to month. In the course of this work the Bureau of Mines cooperated with various departments, bureaus, and Government establishments.

Cooperative agreements.—In its endeavor to act most effectively with State agencies seeking the improvement of efficiency and the lessening of accidents in the mineral industries, the Bureau of Mines, with the approval of the Secretary of the Interior, had made cooperative agreements with State organizations and with State universities and mining schools. During the fiscal year, ended June 30, 1919, investigations relating to safety and efficiency in the mineral industries were conducted under cooperative agreements with the bodies named, as follows: University of Arizona, Tucson, Ariz.; Industrial Accidents Commission of California, San Francisco, and University of California, Berkeley, Calif.; University of Idaho, Moscow, Idaho; Colorado School of Mines, Golden, Colo.; engineering experiment station of the University of Illinois, Urbana, Ill., and Illinois Geological Survey; University of Minnesota, Minneapolis, Minn.; Ohio State University, Columbus, Ohio; Oregon Bureau of Mines and Geology; Industrial Commission of the State of Utah and State School of Mines of the University of Utah, Salt Lake City, Utah; University of Washington, Seattle, Wash.

Mine experiment and mine safety stations.—The bureau has 11 mining experiment stations, 9 mine safety cars, and 7 mine safety stations. The mining experiment stations are investigating mining and metallurgical problems; the mine safety stations are instructing

miners in first-aid and rescue methods, and in giving assistance after mine disasters. The mining experiment stations are at Pittsburgh, Pa.; Columbus, Ohio; Urbana, Ill.; Minneapolis, Minn.; Bartlesville, Okla.; Salt Lake City, Utah; Golden, Colo.; Tucson, Ariz.; Berkeley, Calif.; Seattle, Wash.; and Fairbanks, Alaska.

The mine rescue or mine safety stations are situated at Pittsburgh, Pa.; Vincennes, Ind.; Norton, Va.; Jellico, Tenn.; Birmingham, Ala.; McAlester, Okla.; and Seattle, Wash. The mine safety cars have headquarters at Pittsburgh, Pa.; Huntington, W. Va.; Ironwood, Mich.; Terre Haute, Ind.; Pittsburg, Kans.; Butte, Mont.; Raton, N. Mex.; Rock Springs, Wyo.; and Reno, Nev. The bureau also maintains four motor rescue trucks—one at Pittsburgh, Pa., one at Birmingham, Ala., one at Vincennes, Ind., and one at Seattle, Wash.

War work.—At the beginning of the year the bureau was centering its efforts on war work. In this work the bureau cooperated with the War Department, Navy Department, Department of Agriculture, United States Fuel Administration, National Research Council, United States Shipping Board, Capital Issues Committee, Council of National Defense, War Industries Board, Bureau of Standards, and with other bureaus of the Interior Department.

The work included investigations of minerals, ores, and metals especially needed, cooperative work for the Army and the Navy, and various investigations relating to fuels.

The most noteworthy undertaking was the development of a process for recovering helium, for use in balloons and airships, from natural gas. This work, begun the year before in cooperation with the War and Navy Departments, resulted in the production of 150,000 cubic feet of helium before the signing of the armistice, and demonstrated the merits of the Bureau of Mines, or Norton process, plant for the recovery of helium.

Under an allotment of funds from the Ordnance Department of the Army the Bureau of Mines designed and supervised the construction of a large plant at Saltville, Va., for the manufacture of sodium cyanide by the Bucher process.

During the year the War Department erected at Sheffield, Ala., a plant for the oxidation of nitric acid from ammonia. The apparatus in this plant, which was more efficient than any hitherto devised, was the result of experiments conducted under the direction of the Bureau of Mines, in cooperation with the Ordnance Department and the Semet Solvay Co., at Syracuse, N. Y.

War minerals investigations.—Minerals and metals especially needed during the war included manganese, chrome, tungsten, pyrite, tin, graphite, and potash. The bureau up to the signing of the armistice was examining deposits of these minerals and study-

ing methods of mining, treatment, and utilization. About 100 persons were engaged in this work, of whom about 90 were mining engineers, metallurgists, or chemists. About 60 per cent of these men were engaged in the staff and field work of the larger investigations; the rest were consulting engineers working on special problems. After the armistice the bureau continued to give attention to market conditions and to economies in treatment, with the purpose of enabling producers to meet the conditions brought about by the great decrease in demand consequent on the cessation of hostilities.

War minerals relief commission.—A rider attached to the Dent military bill (Public 322), approved March 3, 1919, authorized investigation and payment of net losses incurred by producers of manganese, chrome, pyrite, and tungsten, when such losses had been incurred as a result of Government request. The maximum amount to be expended for such relief was limited to \$8,500,000. A commission of three members is reviewing the claims and making the awards. The Secretary of the Interior authorized the Director of the Bureau of Mines to conduct the field engineering and accounting investigations, also the office routine and administrative work for the commission.

Explosives regulation.—By the provisions of the act regulating the manufacture, distribution, storage, use, or possession of explosives and their ingredients during the war (Public 68, H. R. 3932), the Bureau of Mines, under rules and regulations approved by the Secretary of the Interior, exercised wide powers. When the armistice was signed it had appointed more than 14,000 carefully selected licensing agents throughout the United States and its insular possessions, and had issued about 1,000,000 licenses. In administering the act the bureau sought to stop careless practice in the use of explosives, examined magazines throughout the country in order to prevent storage of explosives under dangerous conditions, investigated violations of the act and of outrages against life and property, and took steps to have offenders punished. After the signing of the armistice some of the regulations for carrying out the purposes of the act were made less stringent.

Regulation of platinum.—Because of the imperative need of platinum in the manufacture of chemicals and munitions and the inadequate supply of the metal, Congress by the act of July 1, 1918 (Public 181), authorized the Director of the Bureau of Mines, under rules and regulations approved by the Secretary of the Interior, to limit during the period of the war the sale, possession, and use of platinum, iridium, palladium, and compounds thereof. Because of the signing of the armistice the restrictions imposed through this act were removed by the director of the bureau, with the approval of the Secretary of the Interior, on November 14, 1918.

Administrative divisions.—For purposes of administration the technical and scientific work done by the bureau at its Washington office and at its various mining experiment stations was grouped in five divisions, as follows: Mining, fuels and mechanical equipment, metallurgy, mineral technology, and petroleum technology. Each of these divisions was under a chief who reported to the director. The work on war minerals, organized as the war minerals investigation, was placed in a separate division, as was that on explosives' regulation. Each of these divisions had its headquarters in Washington. The work done at the experiment stations was under the general direction of the supervisor of experiment stations, who had headquarters in the Washington office.

During the fiscal year the mining division conducted various investigations regarding health, safety, and efficiency in coal mining and metal mining, had charge of the training and rescue work done through the mine safety stations and cars, and supervised Federal mine inspection in Alaska and on Indian lands; the metallurgical division carried on investigations relating to the prevention of waste and the increase of efficiency in the treatment of ores and of various metals, nearly all this work being done through the experiment stations; the mineral technology division had charge of work on alloy steels and of some special work for the War and Navy Departments, practically all of the mineral technology work of preceding years being transferred to the war minerals division; the division of petroleum technology had charge of work dealing with the increase of safety and efficiency in the production, handling, and utilization of natural gas, petroleum, and petroleum products.

At the end of the year the organization of the bureau was being changed so as to have all research work segregated in a research branch and all work dealing with operation and administration routine in an operations branch.

Mine rescue and first-aid training.—Through its mine safety stations and cars, the bureau renders aid at mine disasters and trains miners in first-aid methods and the use of rescue equipment. During the fiscal year ended June 30, 1919, the men attached to these stations and cars investigated the causes of 29 mine accidents—19 at coal mines and 10 at metal mines—and trained 9,781 miners in first aid and rescue methods. Nearly 65,000 miners have received training through the cars and stations since the beginning of this work by the Government.

Mine explosions and fires.—At the experimental mine of the bureau, near Bruceton, Pa., work relating to the causes of mine explosions and methods of prevention was continued. Various explosives were tested to determine their permissibility for use in gaseous or dusty coal mines; 2 of these were approved, and the permissible

list at the end of the year contained the names of 162 explosives. More than 37,000,000 pounds of these explosives were used in the coal fields of this country during the calendar year 1918, as compared with 2,000,000 pounds of similar explosives in 1908, the year in which the testing of mine explosives by the Government began. The total quantity of permissible explosives used throughout the United States in the calendar year 1918 was 46,045,233 pounds. Explosion-proof equipment for mines was tested and approved.

Health of miners and sanitary conditions at mines.—In cooperation with the Public Health Service the bureau continued work relating to the health of miners and to sanitary conditions at mines. Especial attention was given to ventilation conditions in mines in Arizona. Owing to the need of surgeons in the Army and the influenza epidemic, the cooperative work of the Public Health Service had to be curtailed in the early part of the fiscal year. During the epidemic the crews of several of the cars rendered efficient service in caring for the sick. In the latter part of the year two surgeons of the Public Health Service, each assigned to one of the new mine safety cars of the bureau, examined miners as to their fitness for mine-rescue work, gave public lectures on matters relating to first aid, sanitation, and hygiene, made sanitary inspections at different mines and mining communities, and suggested to owners or operators the improvement of conditions so as to lessen the risk of preventable or occupational diseases.

Fuel investigations.—In its efforts to increase efficiency in the use of coal and lignite the bureau is studying the properties of these fuels and the methods of burning coal, lignite, and coke in boiler and house-heating furnaces. Also it is collecting, analyzing, and testing samples of coal belonging to or for the use of the Government. During the year the bureau assisted in an advisory capacity the Fuel Administration and various departments and establishments of the Government in solving problems relating to the efficient use of fuel for heating or power. It had charge of tests of marine boilers for the Emergency Fleet Corporation, and as a result of these tests changes were made in the methods of baffling the boilers and of admitting air to the furnace, which increased the efficiency of certain boilers 16 per cent. Toward the end of the fiscal year, under an appropriation of \$100,000 by Congress, the bureau began a comprehensive investigation of the best methods of utilizing the great beds of lignite in Texas, the Dakotas, and other States, this investigation to include the erection of a plant for carbonizing lignite and producing gas as a by-product.

Increasing efficiency and lessening waste in the petroleum and natural-gas industries.—Through its petroleum division the Bureau of Mines is investigating problems of petroleum and natural-gas technology. These problems are grouped in four classes, as fol-

lows: Production technology, including methods of preventing infiltrating water from entering oil and gas sands through wells, the determination of the ultimate production and hence the value of oil lands, the occurrence and relation of gas, oil, and water in different fields, and the preparation of refinery statistics; engineering technology, including waste of oil in storage and transportation, the prevention of gas and oil well fires; investigations of refinery practice, the recovery of gasoline from natural gas, the production of carbon black from natural gas, and economy and efficiency in the use of oil fuel; chemical technology, including the routine examination of samples of fuel oil and gasoline, the preparation of specifications for petroleum products, the inspection of gasoline for military use overseas, the character of the motor gasolines sold throughout the country, the study of cracking processes for making gasoline; and oil-shale technology, including a review of the oil-shale situation in the United States and the work being done at distillation plants erected by private concerns. In addition members of the petroleum commission served on various war-time boards and commissions, including the Interallied Petroleum Conference.

Government fuel yards.—The sundry civil act approved July 1, 1918 (Public 181), carried among the appropriations for the Bureau of Mines an appropriation of \$432,300 for the establishment of fuel yards in the District of Columbia for the use of all branches of the Federal service and the municipal government in the District of Columbia, and also an appropriation of \$1,154,088 for the purchase and transportation, storing, and handling of fuel, and the maintenance and operation of the yards and equipment.

During the year a yard with storage capacity of 20,000 tons was equipped and put in operation under the direction of the Bureau of Mines. The equipment comprises hoppers, bins, and belt conveyors. The approximate cost of the yard and its equipment was \$260,000. For distributing the coal to the various buildings in the District a fleet of 33 motor trucks was purchased. During the fiscal year 247,540 tons of fuel were purchased, 165,669 tons being handled by the trucks.

Bartlesville experiment station.—The Bartlesville station is giving all its time to problems of the petroleum and natural-gas industries. Two brick buildings for the station were completed during the year. The research work done through the station included investigation of the use of the absorption process for recovering the residual gas from compression plants for obtaining gasoline from natural gas; investigations and demonstrations of methods of preventing water from entering gas and oil sands through wells; an investigation of the manufacture of carbon black from natural gas, with regard to the possible development of more efficient methods of production; an

investigation of the loss of the lighter hydrocarbons from crude oil during storage, one of the great losses in the petroleum industry; and an investigation to ascertain a practicable method of recovering oil from emulsified mixtures of oil and water.

Berkeley experiment station.—The work of the year included various war mineral problems; problems relating to the treatment of quicksilver ores; and investigations of the volatility of metallic compounds, with especial reference to the volatilization processes of ore treatment that were being developed at the Salt Lake City station.

Columbus experiment station.—The Columbus station is situated at the Ohio State University. New quarters erected by the university for the station were ready for occupancy in October, 1918. The chief investigations for the year were as follows: Crucible-making properties of American graphites and bond clays as compared with foreign materials; physical properties and pottery-making values of American white clays as compared with imported white clays; possible development of a suitable refractory from domestic dolomite as a substitute for imported magnesite; cooperative work with the United States Geological Survey, in the investigation of clays throughout the country; ceramic-equipment design, with a view to improving the efficiency of apparatus and equipment used in ceramic industries; cooperative work with the Ohio geological survey in an investigation of the refractory fire clays of the State; spalling tests of fire brick.

Fairbanks experiment station.—The station at Fairbanks, Alaska, investigated the value of Nenana lignite as boiler fuel, and the possibility of using the lignite as fuel for a central electric-power station with transmission lines to near-by mining districts. The station also made tests of the possible recovery of gold from heavy sands remaining in sluice boxes after a clean-up; the concentration of chromite in beach sands; the flotation of molybdenite from low-grade ores, and the concentration of gold-bearing antimony ore.

Golden experiment station.—Most of the work of the Golden station is on rare metals. During the year the investigations of radium included the study of the chemical effects of radium emanation in gas reactions. Work on zirconium resulted in the preparation of samples of the pure metal and the determination of its properties. A cooperative investigation of the recovery of molybdenite from ores by flotation resulted in the development of methods that increased the recovery at the mill of the cooperating company 15 to 20 per cent. Other work on molybdenum included the metallurgy of wulfenite and the separation of wulfenite from baryte. A method was devised for commercially treating cuprodescloizite, a mineral containing lead, vanadium, and copper, and methods for treating vanadinite (lead vanadate) were investigated. Considerable work

was done on phosphorescent zinc sulphide, used with radium luminous paint, to discover the causes of luminosity.

Minneapolis experiment station.—Problems connected with the treatment of manganese ores and the production of manganese alloys received chief attention during the year. The investigations conducted were as follows: Examination of the manganiiferous iron mines of the Cuyuna Range, Minnesota; ore-dressing tests of manganiiferous ores from various places in the United States; blast-furnace practice for the production of ferromanganese and spiegeleisen; use of manganese alloys in open-hearth steel practice; the Jones process for the direct reduction of manganiiferous iron ores and recovery of the manganese; the Bourcoud process for the direct reduction of iron ores; mining methods in the Lake Superior region; analytical work on steels, slags, and alloys; and an investigation of low-grade sulphide gold ores in the Black Hills, S. Dak.

Pittsburgh experiment station.—The work of the Pittsburgh station, the largest of the experiment stations, comprised mining problems, including first-aid and rescue methods, fuel problems, petroleum investigations, and chemical research. The mining investigations included tests of the explosibility of coal dust and of methods of preventing or stopping mine explosions; tests of explosives and of electric equipment to determine their permissibility for use in dusty or gaseous coal mines, tests of geophones, or listening devices for mine rescue and other purposes; explosives research for the War Department; and tests to determine the value of T. N. T. as an explosive for engineering and industrial use. The fuel investigations related chiefly to the combustion of fuel in boiler and house-heating furnaces, heat transmission in boilers, boiler and furnace design, the use of coke as a household fuel, and the use of powdered coal. Petroleum investigations included routine analyses of oils and greases, tests of samples of gasoline collected throughout the United States, and the development of apparatus and methods for the analysis of petroleum and its products, and an investigation of the after corrosion of Army rifles. Chemical research work included the devising of methods of analyzing graphite; tests of the fusibility of ash of coal from different fields; routine analyses of coal and coke, mine gases, natural gas and fuel gases; chlorination of natural gas for the production of chloroform and carbon tetrachloride; tests of odors for use as danger signals in the compressed-air lines of metal mines; tests of gas masks and respirators for mining or industrial use; devising of portable indicators for detecting various gases; and the sampling and examination of rock dust in the atmosphere of metal mines.

Salt Lake City experiment station.—At this station, under a co-operative agreement with the University of Utah, various improvements were made in facilities and equipment and much new apparatus

was added, especially apparatus for the ore-testing laboratory. The work of the year comprised various war minerals investigations, including concentration tests of chrome, quicksilver, and manganese ore, methods of refining graphite, recovery of potash from alunite; research work on oil shales; precipitation of zinc from hydrometallurgical solutions and recovery of metals from ores by the volatilization process.

Seattle experiment station.—During the early part of the year work was mainly on war minerals investigations, chiefly concentration tests of chrome and manganese ores; during the latter part of the year regular investigations were resumed. In cooperation with the University of Washington four groups of investigations are being conducted, as follows: Coal, electrometallurgy, flotation, and ceramics. The coal investigations comprised mining methods in Washington, the causes of "bumps" or air blasts in coal mines, Alaskan coal problems, standardization of float and sink tests in coal washing, and the storage and use of pulverized coal. Electrometallurgical investigations were hampered by nonarrival of equipment for the laboratory. Work was done on the recovery of valuable minerals from ores by flotation, and methods were devised for determining molybdenum in ores and titanium, and chromium in beach sands. In cooperation with the Oregon Bureau of Mines and Geology chrome deposits in Oregon were examined and flotation tests made with a silver-gold ore.

Tucson experiment station.—The offices and laboratories were moved into new buildings of the University of Arizona, and the new metallurgical laboratory was equipped. The principal work of the station dealt with the leaching of mixed sulphide and nonsulphide porphyry copper ores. The war minerals investigations were chiefly the investigating of manganese resources and the concentration and leaching of low-grade siliceous manganese ores.

Urbana experiment station.—Investigations in progress during the year included the study of surface subsidence resulting from coal mining in Illinois, the origin and control of mine fires, the composition of coal-mine atmospheres, the occurrence of sulphur in coal, a general investigation of coal-washery practice in the Middle West with a view to the improvement of existing methods, a general study of water-gas manufacture with especial reference to the use of Illinois coal, and the possibility of making wider use of coal brasses (pyrite) in the manufacture of sulphuric acid.

Ithaca office.—The field office at Ithaca, N. Y., worked on two main problems—electric smelting of manganese ores and the preparation of special alloy steels for the Army and Navy.

Moscow office.—In cooperation with University of Idaho the Bureau of Mines maintained a field office at Moscow. The work of

this office included investigations of the treatment of complex lead-zinc sulphide and copper-iron sulphide ores with reference to the recovery of the valuable metals by differential flotation, and the treatment of antimony ores by sulphidizing followed by flotation.

NATIONAL PARK SERVICE.

The tremendous popularity of our national parks was fully attested by the unprecedentedly large number of visitors during the 1919 season, which closed about the middle of September. Freed from the restrictions against war-time travel, which had been a war necessity, the appeal of the great natural attractions of the parks was irresistible and the response spontaneous. The national parks became the cynosure of the eyes of a war-weary and hard-worked people, bent on taking a holiday where they could derive the greatest benefits. There the refreshing atmosphere of the great Out of Doors, the soothing diversion of the natural scenery, and the specific qualities of the fresh air brought mental and physical relief to hundreds of thousands. When one considers that travel to our national parks and monuments exceeded 810,000 visitors—over 755,000 to the parks and over 55,000 to the monuments—it is evident that the recreative value of the parks is a tremendous factor in the health, wealth, and contentment of the Nation.

The following tables will give an itemized review of the travel:

Visitors to the national parks in 1919.

Hot Springs	¹ 160, 490
Yellowstone	62, 261
Sequoia	30, 443
Yosemite	58, 564
General Grant	21, 574
Mount Rainier	55, 232
Crater Lake	16, 645
Wind Cave	26, 312
Platt	¹ 25, 000
Sullys Hill	4, 026
Mesa Verde	2, 287
Glacier	18, 956
Rocky Mountain	169, 492
Lassen Volcanic	¹ 2, 500
Hawaii	(²)
Mount McKinley	(²)
Grand Canyon	37, 745
Lafayette	¹ 64, 000
Total	755, 527

¹ Estimated.

² No record.

Visitors to some of the national monuments in 1919.¹

Capulin Mountain (New Mexico)-----	² 1, 500
Casa Grande (Arizona)-----	² 3, 795
Colorado (Colorado)-----	² 3, 000
Muir Woods (California)-----	² 43, 200
Petrified Forest (Arizona)-----	² 3, 000
Zion (Utah)-----	² 1, 814
Total-----	55, 309

Analysis of park-travel figures.—An analysis of these figures shows that the travel in 1919 was 67 per cent over that of 1918 and 54 per cent more than that of the previous high-water mark in park travel of 1917. An astounding increase occurred also in motor travel to the national parks. The increase of the number of cars, 95,140 in 1919 over that of 55,296 in the record year 1917, is 72 per cent. While no accurate general record is kept in all the parks of the number of tourists entering in motor cars, in Yellowstone it is found that they average about four to the car, as will be seen from the following tables for the past three years:

Year.	Number of private cars.	Number of tourists.
1917.....	5, 703	21, 263
1918.....	4, 734	17, 317
1919.....	10, 773	40, 936

With this average in mind it is estimated that about 400,000 visitors entered the parks and monuments by motor. The travelers came from every State in the Union and from foreign countries, and the motorists from every corner of the country and from Canada and Mexico. Some of the motorists visited all of the national parks of the continental west and others toured from two to five. More than half carried their own supplies and camp equipment, and they enjoyed the playgrounds in their own way.

Conventions in the parks.—Conventions in various parks during this year of tremendous travel were the cause of some overcrowding of hotel and camp facilities. It may be necessary in the future to restrict the holding of conventions in the parks until the hotel and camp facilities can be extended beyond their present capacity. The aim is first of all to accommodate the traveling public. Among the conventions held in the parks were those of the Montana Bankers' Association, in Yellowstone Park; the Washington Bankers' Association, the West Coast Lumbermen's Association, the Association of Western Confectioners, the Knights of Pythias, the Order of the Eastern Star, in Mount Rainier; and the Native Sons of the Golden West in Yosemite.

Cooperation of United States Railroad Administration.—In these large travel figures the influence of the activities of the United States

¹ No records for other 17 national monuments.² Estimated.

Railroad Administration is also reflected. During the war travel was discouraged. Soon after the cessation of hostilities, however, the administration changed to a stand just opposite to the former policy, and by judicious advertising and education of those of its employees who come in direct contact with the tourists, stimulated the patronage of the winter resorts in the South and West to unusually gratifying proportions. Later, through its passenger traffic committee, it directed its efforts toward the summer resorts of the country with special emphasis on the national parks. The promotion of park travel, of course, fell naturally to the western committee of the railroads and to the Bureau of Service, National Parks and monuments, with headquarters at Chicago. This latter bureau was well organized and prepared to perform its functions without delays when the restrictions were raised. By attractively designed and well-written national park booklets they presented a feature of their campaign that offered at once the most important inducement to travel in the parks that has appeared since the publication of the National Parks Portfolio some three years ago. The very satisfying result achieved by this bureau testifies to its great importance and the extreme desirability of its surviving as one of the institutions of the Railroad Administration whenever the railroads are turned over to private operation.

Touring and industry.—At this writing restrictions against overseas travel have also been removed. The competition of Europe for tourist travel will begin with renewed activity. We have in this country scenery that is the peer and in most instances the superior of that found abroad, but the value of tourist travel as an industry has hardly been recognized in this country. Various industries of the United States are protected as a matter of course, but what protection will the great resorts of this country have from the greatest campaign for tourist travel in foreign lands that will ever have been waged? As a nation we have failed to grasp the significance and value of the tourist industry. Every dollar of revenue received from it stays here. Before the war Americans spent in England alone about \$200,000,000 a year, and in France and Switzerland \$400,000,000. We should develop this industry, as other countries are doing, into one of our biggest economic assets.

The need of a touring agency.—To properly develop this the establishment of a touring agency is a present national necessity. It is vitally important to the Nation, and, as there is no other agency of the Government that is so interested or so closely in touch with the traveling public as the National Park Service, the agency should be established there. Such an activity could cooperate closely with the resorts of the United States, the railroads, automobile associations, highway associations, mountaineering clubs, etc. Promotive

literature bearing the stamp of approval of the department and of the National Park Service would most effectively stimulate and maintain travel in the United States, because its data would not be selfish or exaggerated and would have the confidence of everybody using it.

The national parks in the field of education.—The dissemination of information regarding the national parks and national monuments, aside from its value from a tourist standpoint, has maintained its high place in the educational field. While no entirely new literature regarding the national parks has been issued, the existing circulars for all of the parks were published in considerably increased editions. During the year 185,000 of such publications were issued and approximately 167,500 have been distributed. Mountaineering in Rocky Mountain National Park by Supt. Roger W. Toll, of Mount Rainier Park, and Wild Animals of Glacier National Park by Vernon Bailey and Florence Merriam Bailey, compiled last year, were available for distribution during the season. A new edition of the popular pamphlet, Glimpses of Our National Parks has been prepared and another pamphlet, entitled Glimpses of Our National Monuments, is in course of preparation; these will be available for next season's work. Large editions of automobile maps were widely distributed. Popular publications on the wild life of Mount Rainier National Park, the flora of Glacier National Park, and the bird life of Papago Saguaro National Monument and adjoining regions will be ready during the coming winter months. Copy for an information circular on Zion Monument has been prepared. The value of the parks and monuments for profitable summer investigations in numerous branches of scientific and historic research is more and more apparent. Columbia University has definitely opened a field of national park study as a distinct feature of its curriculum; it is conducting a course in the scenery of the national parks with special emphasis on its creation by the forces of nature that have developed the surface of the earth and are still engaged in modifying and changing it.

During the summer the University of California through its extension division established a course of lectures on national parks, which are to be given every year in Yosemite Valley. These are to be known as the Le Conte Memorial Lectures, in commemoration of the late Joseph Le Conte's devotion to the national parks and his contributions to science. The lectures were popular and well attended. The next season's series are already being printed.

Camp-fire talks, such as were given by Dr. Matthes of the Geological Survey, at popular camps in Yosemite and at the Sierra Club camp fires by Dr. J. Walter Fewkes in the Mesa Verde National Park, and by other men interested in this educational extension work

prove intensely interesting features of the education of the visitors to a real appreciation of the meanings of the natural formation in the parks. The opportunities for field laboratory work in the parks for students are unlimited and the endeavor will be to have these opportunities developed in an increasing degree from year to year.

Establishment of museums.—The museum established at Mesa Verde National Park to house relics taken from the cliff dwellings and other prehistoric buildings of the park has become one of the most interesting and enjoyable features of the reservation. In the plans for a new administration building for Yosemite Park provision was made for a large museum to be constructed with every modern appliance for effective exhibitions. In Yellowstone National Park a large room in one of the buildings selected for headquarters will be developed as a museum to house specimens of the hundreds of different objects of interest that the park contains. At the Casa Grande National Monument a collection of prehistoric implements and other relics of interest, together with a library of archeology and ethnology, has been assembled. In Rocky Mountain Park collections of specimens of wild flowers and exhibits of mounted birds and animals are attracting attention. This work promises to be of great value to the public and will create a true understanding of the historic aspects and wild life of the parks. Supplemented by the various publications put out during the year, such as *Wild Animals of Glacier National Park* and similar educational papers, the attractions and biological history of these areas will be available to the public in varied form. The Biological Survey under the Department of Agriculture, the University of Washington, and the National Park Service are cooperating at this writing in the gathering of data for popular articles on the wild life of Mount Rainier National Park, and the Smithsonian Institution is assembling data for a book on the flora of Glacier Park.

Film and pictorial service.—The National Park Service has maintained a wide circulation of pictures, films, lantern slides, and other pictorial material. The demand for these, while not as heavy as prior to the war, was still very extensive. The great interest in the national parks shown by organizations and societies is fully evidenced by the continued demands for such material. Travel exhibits of national park pictures are constantly on view in various cities. Money is needed for more material of this kind so that the rapidly increasing demand may be met. All these parks are reservations for wild animals; they contain some of the finest game preserves in the world. With few exceptions, the wild animals of the park have thrived splendidly. The open winter helped to make raising conditions good. Toll taken by poachers and the occasional results of sporadic epidemics, of course, make certain inroads each year. It is particularly

important that appropriations become available for the administration of Mount McKinley National Park in Alaska, which was created primarily to protect its splendid animal life. Complete jurisdiction of the United States over the California and Colorado parks should also be speedily effected to protect the wild animal life. It is also highly important that a number of States give attention to the establishment of game preserves adjoining the national parks, particularly in California; these are essential to the preservation of the growing herds of animals after they leave the park boundaries, and particularly in the wintertime, when cold and scarcity of food drive them into the lowlands outside of the existing park boundaries and beyond our present protective care. Unusual success was experienced in killing of predatory animals; so much so that there has already been a noticeable increase of the deer and other species that are usually their victims.

Fishing a favorite sport in the parks.—Fishing in the parks was excellent during part of the season, but the large number of tourists enjoying the sport greatly depleted the stock. Large consignments of fry were planted in practically all the parks, but this operation will have to be conducted on a larger scale in the future. The cooperation of the United States Bureau of Fisheries and some of the States in this phase of park development was particularly gratifying. Good fishing for the visiting public is one of the most appealing diversions offered by the parks, and opportunities for following this sport will be intensively improved.

Park-to-park highway.—The immense value of a park-to-park highway is becoming yearly more apparent. Where in former years relatively few communities were in favor of it, now there is a wide demand for such a connecting link between these scenic areas. Motorists find that in almost every town along the routes from their homes to the parks or between the reservations themselves a well-kept automobile camp is established which they are privileged to use free of charge. Many of these camps are adequately equipped and wood is nearly always available; of course, small charges are made in places to cover the cost of wood or other fuel. The automobile camp of the western towns and cities is now an institution and a particularly enjoyable adjunct of park-to-park travel. The first extensive park-to-park trip to be made by using the special transportation facilities provided by the Yellowstone Park Transportation Co. and the Glacier Park Transportation Co. was made by a party organized by and under the guidance of the Brooklyn Eagle, which undertook the trip in July and early August. The trip was a great success.

In connection with the park-to-park highway travel it was very interesting to note the large numbers of parties traveling between the parks on trains. While no record is available of the number who

traveled by this means, several large bodies, such as the Travel Club of America, the Massachusetts Forestry Association, and the National Editorial Association, were noted.

The Director of the National Park Service covered a number of sections of the park-to-park highway as it could be designated in Oregon, Washington, and California, between Sequoia and Mount Rainier National Parks, and found most of them to be in reasonably good condition and available as links in the national park highway system. There are many sections of this proposed system so situated as to require no special designation, but again there are other near-by routes that might be selected. Designations have been made by the National Parks Highway Association with headquarters in Spokane, Wash., with particular emphasis on the sections between Yellowstone, Glacier, Mount Rainier, and Crater Lake National Parks. The Yellowstone Trail Association at Aberdeen, S. Dak., and the National Park-to-Park Highway Association, which has its headquarters at Cody, Wyo., have designated other routes.

When the idea of an interpark highway was first suggested it was conceived as a great circular route, combining the major national parks of the West, but beginning and ending in Denver, Colo. It may, however, be necessary to make a number of alternative routes in the system and a few of what might be termed small circle tours for the use of motorists. To complete the big tour in one season will be difficult. In this connection it will be of interest to mention a conference held in Yellowstone Park on August 10 and 11, at which 12 States were represented, for the purpose of discussing ways and means of expeditiously advancing the selection and improvement of the park-to-park highway and cooperating with the National Park Service in the encouragement of travel to the parks. This conference was organized as the National Parks Touring Association to secure the "cooperation and coordination of all State and National highway associations with a view to a composite road system leading to and connecting the national parks." This organization is practically completed. L. L. Newton, of Cody, Wyo., is general secretary of the association. The men who attended this conference have had a particularly broad experience with good-roads movements in the Western States and an intimate knowledge of the requirements of the situation.

States cooperating in road building.—Some of the States are cooperating with the park administration by providing highways to the park entrances. A particularly conspicuous example of this is found in California, where Tulare County has paved the highway to Three Rivers, the junction of the entrance roads to Sequoia Park; and the State has recently passed a \$40,000,000 bond issue containing an item of \$300,000 for completing the paving of the roads to the

park line. At Yosemite Park the construction of a paved highway from Merced to El Portal is being promoted by California business men. In Oregon the State and the Federal Government are constructing a highway that will later be paved from Medford to the west entrance of Crater Lake Park, some 72 miles. Washington is cooperating by issuance of bonds to pave the entrance roads to Mount Rainier Park, and Colorado is improving the entrance roads to Rocky Mountain National Park. Montana also is doing its share, with the cooperation of several counties, in improving the roads approaching the Yellowstone and Glacier Parks; and Wyoming is rebuilding two roads leading to the south entrance of the Yellowstone. These last two States are concentrating a large portion of their highway funds on these park approaches.

Park road construction a vital necessity.—Practically no money, however, has been available for road extensions in the national parks this year with the exception of a fund provided to complete the rebuilding of the El Portal Road in Yosemite. Work on the highways within the parks has been confined entirely to ordinary maintenance and repair. In some of the parks the funds available have not been sufficient even to prevent perceptible depreciation. An appropriation of approximately \$1,000,000 a year for a period of years for extending the existing road systems of the parks is one of their most vital needs. The Government is cooperating with the States with an expenditure of millions of dollars in the building of highways, which includes at the same time a program for the development of roads through the national forests; the main scenic features of the parks should in a similar manner be placed available to the traveling public and the road systems within the parks should be developed and enlarged to accomplish this. Our motorists should at least find as good roads within the parks as they find in the approach roads to the parks which the States and counties furnish, particularly as the Government exacts an entrance fee from the automobile owners for using the park roads.

The need for paving roads is particularly pressing in Yellowstone, Yosemite, Crater Lake, and Mount Rainier. All one-way roads used for two-way travel should be widened to accommodate that double travel.

New road construction in prospect.—The National Park Service has a number of important new highway construction projects ready to be undertaken as soon as funds are provided. Surveys and estimates of cost have been made, and work can be started without delay. A transmountain road in Glacier Park to connect the east and west sides of the park is one of the most interesting, since it will connect the two sides of the park now practically separated from each other by the mountainous masses of the Continental Divide; unless a round-

about way is taken the east side of that park is isolated from the west side; only parts of this wonderful park area have been made accessible. Other projects of first importance are a road connecting the Yosemite Valley with Tenaya Lake on the Tioga Road—a road in Sequoia Park to connect the valley of the Middle Fork of the Kaweah River with the Giant Forest. At the Grand Canyon a road along the rim from El Tovar to Grand View is an immediate necessity, and the Carbon River Road along the river of that name to the mouth of the Carbon Glacier in Mount Rainier Park should be undertaken as soon as possible. In Rocky Mountain Park what is known as the Trail Ridge Y route demands recognition as an important road project. Other important road projects have been studied and planned and will be submitted for the information and action of Congress in due time. Perhaps the most important engineering project completed during the year was the construction of the new road in the Gardiner River Canyon, in the Yellowstone.

New trails.—Hand in hand with the development of roads goes the construction of new trails. Trail surveys and studies conducted by the engineering department included projects in the Grand Canyon Park and the Belly River district in Glacier Park. The allurements of the trails are strongest in the true lover of nature, and the construction of such leaders into the innermost recesses of our park wonderlands, where their glories may be enjoyed quietly and uninterruptedly, is an important part of national-park administration and development.

Accomplishments of the engineering and landscape engineering departments.—The advice these two sections are able to give in the development of the parks is of immeasurable value. In the manifold perplexing problems of road building, sanitation, construction, and water supply, the engineering department has proved its worth in the many problems covering the individual parks. The harmonizing of the necessary buildings, public and concessions, with the landscape; the correct location of all structures; the blending of design, whether buildings, bridges, or other structures, with each other and natural features of the landscape have been some of the problems that are being satisfactorily met by the landscape department. Many improvements in the location of camps have been planned, and in the construction of new hotels incidental to the tremendous demand for additional facilities, these departments are invaluable in their solution. The complex problem of a satisfactory and dignified method of marking the entrances to the park has, it is believed, also been solved by the development of plans of gateways that will be a credit to the parks. The activities of the landscape engineer go also into the details of forest improvement and vista thinning. The schemes for preserving stands of trees along highways, the clearing up of

brush and down timber along roadsides, and the elimination of dead timber in flooded lakes within parks are other problems constantly encountered in the development of the parks and falling within the landscape engineer's bailiwick. In all this work strict conservation is the guiding principle in order that the parks may be maintained in absolutely unimpaired form for the use of future generations, as well as those of our own time. The cordial cooperation evidenced by landscape men in private life who are prominent in their professions promises that the aim of this effort is true, and that the results in time will be eminently satisfactory to the most critical eye and mind.

The advent of aeroplanes in the national parks.—The feasibility of air service into Yosemite National Park was established when Lieut. J. S. Krull, flight commander at Mather Field, near Sacramento, Calif., piloted the first aeroplane into the valley on May 25, effecting a perfect landing after a flight started at Merced, Calif., and lasting 1 hour and 5 minutes. The first aeroplane to fly over Rocky Mountain National Park landed near the Stanley Hotel, at that park, a Curtiss biplane, piloted by Mr. I. B. Humphreys, being used. Although tentative proposals to operate air craft in various parks for passenger-transportation purposes have been made at various times, no definite complete proposition has been submitted. Aero transportation to, from, and between some of the parks may eventually be a popular feature in the development of tourist travel. Flying fields have already been suggested for Lafayette and the Grand Canyon National Parks.

The practicability of using aeroplanes for fire patrols over forested areas has already been proven, and arrangements for patrolling national park areas at regular intervals, particularly the Yosemite and Sequoia Parks, which are close to Mather Flying Field, are contemplated.

Creation of Grand Canyon and Lafayette National Parks.—Efforts extending over a period of many years to make the Grand Canyon a national park had their culmination in the approval by the President on February 26, 1919, of the act establishing this park. This titanic example of erosion, with its area of 958 square miles, now covered into the park system, is the most sublime spectacle of its kind in the world, and it is truly a great satisfaction to have it perpetually reserved from private aggression for the enjoyment of our people. The nucleus of an administrative force has been installed, and work will quickly be gotten under way toward opening up this wonderland to the traveling public by rail and motor. The crying need of all this section of the country is good roads. Only 440 miles distant from Salt Lake City the north rim of the canyon, at present reached by a makeshift roadway and not developed to any degree of satisfac-

tion, has a great future. The south rim of this great abyss is better known to the visiting public, due to its greater accessibility to railroads. Curiously enough, in a land where the action of water was the chief element in the carving of this tremendous chasm and where rock is available in untold quantities, the problem of securing water and of getting suitable rock for roadways is a perplexing one. With the exception of small springs of slight capacity all water is beyond convenient reach in the bottom of the canyons and the rock is too soft for road construction. Both problems will, however, be solved.

The other event of the year of surpassing importance in park annals is the establishment of the first national park east of the Mississippi, namely, the Lafayette National Park, lying on the coast of Maine, near the city of Bar Harbor. This was formerly the Sieur de Monts National Monument. Its creation was the result of the efforts of a whole-souled, public-spirited body of men, of which President Emeritus Charles W. Eliot, of Harvard, and George B. Dorr, the present superintendent, were the prime movers. In addition to its unique distinction as the first national park in the East, it has the added attraction of being our first national park on the sea.

Area of parks and monuments.—The total area of the 18 national parks is now 10,739 square miles, or 6,872,960 acres, and the area of the 23 national monuments is 1,931 square miles, or 1,235,840 acres. There is one national park on the Hawaiian Islands and one in Alaska. There are two monuments in Alaska, which are under the jurisdiction of the National Park Service, and the others are in the States west of the Mississippi. Our national parks now cover an area greater than Massachusetts and Delaware combined.

Material for other national parks and monuments.—The national-park system is not yet complete. Several new national parks should be added, and there should be some important extension to a number of the existing parks. The following are examples: Sequoia National Park should be enlarged to include adjacent areas, and the name changed to Roosevelt National Park. The Teton Mountains and the grand scenic territory of the Jackson Hole region south of the present Yellowstone National Park should be added to that park. The Diamond Lake region, in Oregon, should be added to Crater Lake National Park; Mount Rainier National Park should take in Ohanapecosh Hot Springs. The Mount Evans region, in Colorado, is desirable for inclusion in Rocky Mountain National Park, and changes to round out and modify the boundaries of Yosemite National Park will undoubtedly be desirable. Glacier National Park should be extended to the park highway now traversing the Black-foot Indian Reservation. Zion National Monument, in Utah, will undoubtedly receive national-park status during the coming year.

Bills giving the Bandelier Monument, in New Mexico, national-park status have already been introduced in Congress.

Other projects that have been mentioned for national park timber are the reservation of the Sand Dunes of Indiana, the Mammoth Cave of Kentucky, and the Great Oynx Cave not far distant from it. The Mammoth Cave is a worthy candidate for parkhood and the outright purchase of the cave is a desirable one. Furthermore, there should be a group of parks in the eastern section of the country which would include the best examples of the eastern landscapes and some of its most conspicuous natural features. Although not as rich in natural scenic wonders as the West, the East is entitled to recognition of the importance and value of the unique features of some of its areas by having placed upon them the stamp of superlative excellence which national park status conveys. While Congress has never adopted the policy of purchasing lands for park purposes, there is the precedent which authorized purchase of national forest lands in the Appalachian Mountains under the Weeks Act of March 1, 1911. Furthermore, no more noble gifts can be made to the Nation by public-spirited individuals than tracts of lands suitable for national parks and monuments. The East has already furnished its conspicuous example in the creation of its first national park.

Save the redwoods.—The necessity of saving some of the splendid redwood stands in California, which are fast being cut by commercial enterprise, demands prompt action. The Save the Redwoods League organized to stimulate interest in their preservation is doing splendid work. Bills to preserve a splendid forest of redwood trees of the species *Sequoia sempervirens* have already brought the necessity of quick action in saving these masterpieces of forest creation from the ax of the woodman direct to the attention of Congress.

Another outstanding feature in the preservation of some of our splendid scenic trees is the necessity of preserving strips of redwood and other timber along roads in building, or to be built, in various sections of the States of California, Oregon, and Washington. Nothing should be left undone to achieve this vital result. Even though short-sighted commercialism can not see the value of this, posterity's thanks will be inevitable for even the slightest effort made toward this end. Here is opportunity for cooperation of the most public-spirited sort.

Appropriations.—Due to war-time exigencies, appropriations for national parks, as in other lines of public endeavor, were cut to the bone. The appropriation for the fiscal year 1920 for the national parks and monuments, exclusive of the Hot Springs Reservation, which is self-supporting, amounted to only \$754,195. Developing the

national parks to a standard commensurate with their dignity and importance to the Nation, and to meet the demands made upon them by an appreciative, enthusiastic people requires larger appropriations. The tremendous wear and tear which the roads and trails and other improvements suffered under the great influx of tourists requires ample funds for maintenance and repair. With increasing travel, or even with a future average yearly travel meeting this year's figures, the expansion and development of roads and trails and other facilities to relieve congestion by distribution of visitors must also have attention. Larger crowds mean larger administrative expenditures. In this connection it is of the utmost interest to know that the revenues derived from all of the parks and reservations during the past fiscal year amounted to \$196,703.03.

Forest fires in the parks.—The past year has been particularly serious from the standpoint of forest fires. Glacier and Yellowstone National Parks suffered heavily, the demands of fire fighting at the height of the tourist season taking not only the services of men urgently needed for construction and maintenance work but funds for fighting these fires had to be taken from existing park appropriations, when they could ill be spared. Money was used that was badly needed to perform work that would benefit the traveling public, and which should have been done this season. The necessity for providing a general fire-fighting fund for the national parks to be available in any park in which fires happen to occur is obvious.

Yellowstone National Park.—Congress in granting to the National Park Service absolute control of this park's affairs made possible the great progress of this year. On the withdrawal of the military forces and abandonment of Fort Yellowstone the administration of the park was reorganized. Former Assistant Director Horace M. Albright, of the park service, was made superintendent in June, 1919.

All travel records of this park were broken, the visitors numbering over 62,000. The larger portion of these came in automobiles from every State in the Union. The result was that the hotels and camps became crowded, but the acute shortage of sleeping quarters became serious only in times of storms, when thousands of camping motorists sought shelter. Camp Roosevelt, at Tower Falls, will be greatly expanded, making four large hotels and five permanent camps available to the public next year. But these will have to be further extended to meet the growing tourist demands. Many tourists brought their own equipment and supplies during the greater part of the season, and it is estimated that from 5,000 to 6,000 people enjoyed motor trips over the road system each day. This means that extensive motor camps must be provided. Plans now prepared call for over 50 large camp grounds, reasonably near the park roads.

The elk herds are in danger because of drought injury to the winter range, and winter feeding grounds are necessary. The road system is in fine repair, but the tremendous increase in travel makes necessary extensive improvements, widening of certain sections, renewal and installation of bridges, culverts, etc. New telephone and telegraph lines are also needed for protecting the park from fires, the dispatch of public business, care of emergency calls, and accommodation of tourists. Ranger stations and snowshoe cabins are greatly needed; the former, built many years ago for housing of troop detachments, are now impossible, and the latter, used by patrolling rangers in the dead of winter, are worn out, poorly located, and detrimental to health.

Attention is again called to Mr. Mondell's bill (H. R. 1412) which would add part of the Jackson Hole country, including the Teton Mountains, to the park. Besides the reasons that have been advanced heretofore for adding this region, which belongs to the Federal Government, it would provide a southern entrance, which is much needed.

Foreseeing heavy tourist automobile travel, and realizing the possibilities of connecting Yellowstone and Glacier National Parks, the "Geysers to Glaciers Highway" was organized and promoted during the season just closed, by citizens of Montana. The entire State became enthusiastic in the work of road repair—in some towns all business houses closed while their owners worked on the highways. Another development of the season was the operation of an automobile passenger service between the parks via the "Geysers to Glaciers" route. Passengers were carried to Helena, where they were transferred to cars of the Glacier Park Transportation Co., and taken northward. To care for this new volume of travel Helena is planning the erection of an enormous resort hotel. Train service between Yellowstone and Glacier was also heavy, enough so to warrant the establishment of through sleeping-car service between these two parks. The Yellowstone-Glacier Bee Line Highway will be open next season, and will be popular, both because it is a short route and a scenic one.

Glacier National Park.—Notwithstanding drought and forest fires in this park visitors increased 108 per cent. The small crew of workmen employed for protection and improvement of the park had to be diverted to the fighting of the fires, and essential park funds had to be used for this purpose.

There is a growing tendency for visitors to spend longer vacations at the hotels and chalets, and on camping trips. All this created a demand for saddle horses which at times made an acute shortage. Tourists are becoming increasingly desirous of seeing the northern valleys of the park, and both horse and walking trails are much needed. A definite road construction program is ready as

soon as money is appropriated for this purpose. Montana has continued to give some aid in the maintenance of the road up to the North Fork of Flathead River.

While visiting the park this summer members of the Brooklyn Eagle party subscribed over \$1,100 for the improvement and repair of the road between Babb and the Canadian line, in order to give our park system a connection with the highways of Alberta. The people of Montana and Alberta have called this highway "The Brooklyn Eagle Trail."

A new telephone system is needed as a fire protection and aid to administration of the park and transaction of business with the hotels and transportation lines. The irrigation works are now in operation, and the expected havoc has taken place.

The wild animals are flourishing since the predatory kind have been reduced, and fishing is becoming better each year.

Yosemite National Park.—Travel to this park began earlier than usual, and the volume was sustained to the end of the summer season, making a new record for itself. The realization by the public that Yosemite Park possesses more attractions than just those of the great valley came faster than the administration and business interests expected, so that facilities for accommodating the crowds were severely taxed. Fully half of these visitors were cared for in the great automobile camps, which are a very popular feature of the park.

Emergency improvements were necessary this year, but a new building program must be put in operation. The Yosemite National Park Co., composed of business men of San Francisco and Los Angeles, contemplates immediate improvements to the extent of \$300,000, and it estimates that to care for the travel that is certain to come to Yosemite National Park next year, improvements should be made aggregating \$1,500,000. This includes the building of a new hotel and camp on the floor of the valley, further improvements in the sanitation system, and water supply of Glacier Point hotel, and building of a camp on the Tuolumne Meadows. The lunch camp in Mariposa Grove has proven a great accommodation.

The completion by the State highway commission of a paved road to the gates of the park, promoted by California business men, will when it is completed, make it necessary for the Government to pave the new El Portal Highway and the road system of the valley floor. The proposed Yosemite Valley-Nevada Falls-Tenaya Road must be built, in order to give quick access to the Sierra section of the park and relieve traffic congestion on the floor of Yosemite Valley. It will cost approximately \$500,000 and take several years to complete. As soon as the new all-year road is completed, the winter sports of this park, now enjoyed in a limited way, will become increasingly popular. Half Dome is now scalable; the Sierra Club contributed

a protection for the trail to its top, consisting of a row of iron posts set in the rock, and through which stretches a double cable. A trails development plan is now being worked out with the assistance of the Sierra Club.

Fishing has been excellent, and the State fish and game commission is prepared to build the new hatchery as soon as authority is obtained. The importance of game preserves on the western boundary is again mentioned, as the deer, which are plentiful, need better protection. California has ceded to the Federal Government the protection of the fish and wild animals of the park, to take effect when Congress accepts this tender.

Important cooperative work was performed by the United States Public Health Service in combating the mosquito evil in Yosemite Valley, and making a survey of the sanitation needs of the park. The result of this survey indicates the entire sanitation system of the valley must be rebuilt immediately.

Among the signs of progress is the educational use of the park. This year the Le Conte Memorial lectures were delivered under the direction of the extension division of the University of California; they are to be a park institution, to continue indefinitely. Animal life is also being studied under the direction of Dr. J. Grinnell of the Department of Zoology. To make a detailed survey of Yosemite Valley, the Geological Survey has detailed a topographic engineer, and the Bureau of Entomology has continued to give extensive assistance in controlling insect pests that are attacking the forests in certain parts of the park.

Sequoia National Park.—Proposed legislation to add to this park about 1,300 square miles of scenic area and to change its name to Roosevelt National Park has made the public familiar with this Greater Sequoia project. The suggestion to rename this park in memory of the late former President came from a member of the Boone and Crockett Club, of which Mr. Roosevelt was the founder. The future of this park depends so much on the outcome of the enlargement project that development work is being retarded. The public camps present a problem as to control, sanitation, and water supply. Two new road approaches are borne in mind—one from a point on the Middle Fork of Kaweah River near Hospital Rock to the Giant Forest road system, and the continuation of the road between Sequoia and General Grant National Parks. The first approach road would require approximately two years to construct. Automobile transportation service to the park will be better and more extensive next season.

The destruction of trees all along the Pacific coast and highways of the northern part of the State emphasizes the value of the recent purchase of the Giant Forest by the combined action of Congress

and the National Geographic Society, thus preserving it from the fate of the related forests of the north.

General Grant National Park.—This park, which is steadily growing in popularity, may be one of the main gateways if not the principal entrance to the Roosevelt National Park when this reservation is established. The private lands of a lumber company, on which there are several large stands of sequoia trees and which have been offered to the Government, include the gift of Sequoia Lake, which adjoins General Grant National Park. The 160 acres of privately-owned land within the borders of this park should be acquired by the Government at the value of the property and improvements.

Mount Rainier National Park.—Travel to this park exceeded that of 1918 by 25 per cent, there being 55,232 visitors. This park was a particular attraction to eastern tourists. Hotels and camps were filled to capacity and the week-end congestion of former years was augmented. Paradise Valley was the favorite headquarters for tourists, and extensive housing facilities will be added there to meet such demands for years to come. Anticipating the Labor Day crowds 500 Army blankets were procured from Camp Lewis by permission from the Secretary of War, enabling the park administration to meet this unusual demand. This is an example of the fruits of cooperation between Government departments in the interest of the people. The guide service was particularly successful in contributing much to the enjoyment, enthusiasm, health, and protection of the tourists. Seven large conventions were held in the park during the season, besides which several mountain-climbing clubs pursued their sport there.

The deer are not flourishing because they are not protected in their feeding grounds. A State or county game preserve should be established. An extensive biological survey is now in progress, publication of the results of which will add to the natural history series of the National Park Service. The Longmire property, an eyesore for many years, has been leased by the company now owning the other hotels of the park. The Carbon River region should be opened up next, to relieve the congestion of travel, and after this has been done a hotel will be erected by the concessioners.

A broad scheme of road development has been worked out, which should be executed as promptly as possible. The White River Road should be improved, the Carbon River Road completed to the Glacier, the Carbon and Nisqually Roads connected, and the road between Glacier Basin and the Carbon River completed. The only trail built during the year ascends Klapache Ridge north of St. Andrews Creek and continuing to St. Andrews Park. Mount Rainier National Park should be extended to take in Ohanapecosh Hot Springs, which

would add only a narrow strip to the park, but would mean much for the benefit of the public.

Crater Lake National Park.—The outstanding features of the past year in this park are the completion, after several years' work, of the road around the rim of the lake, and the transfer of the engineering projects from the control of the Corps of the Engineers of the Army. This transfer will permit of future progress in all the parks in accordance with a uniform policy. Trails were built this year from the Rim Road to Sun Notch and Crater Peak. Because of the character of the natural surfaces the maintaining of good roads has been difficult. Experience, however, has taught that an oil-bound macadam road much more satisfactorily withstands travel demands than does water-bound macadam. If Crater Lake National Park is to be developed as a resort for motorists, approach roads must be rebuilt or repaired. State and Federal aid funds are now available and this improvement should be rushed to completion.

The hotel service at Crater Lake Lodge was better than last year. In August nearly 400 members of the National Editorial Association arrived in the park, taxing the hotel's facilities beyond its capacity. However, the chambers of commerce of Ashland and Medford, together with the park superintendent, contributed tents and blankets, making the excursionists fairly comfortable for the one night they spent in the park.

Senator McNary, of Oregon, has introduced a bill providing for the addition of the Diamond Lake section to Crater Lake National Park. A road connecting the Diamond Lake country with the Rim Road would be a simple matter, and with the aid of State and county authorities, from a point south of Crescent on the Central Oregon Highway, a new entrance into this park could be developed. Camping facilities around Diamond Lake are excellent.

Mesa Verde National Park.—Some permanent improvements have been completed, the most important being the new road ascending the Mesa Verde from the east side of Point Lookout. There are still wonderful sections of the park which are inaccessible. Two new highway routes—one following the higher or north rim of the Mesa and the other running south from Spruce Tree Camp, connecting with the Cortez-Shiprock Highway—would open up exhibits of ancient architecture.

Archaeological work which for lack of funds had to be abandoned in 1916 was resumed this year, Congress having appropriated sufficient money to undertake the repair of Square Tower (Peabody) House, which has been in danger of collapse. Dr. J. Walter Fewkes, Chief of the Bureau of Ethnology, is engaged in restoring this structure to a state of security. Excavations of the ruins in this park should be continued systematically, in the interests of the traveling

public and the science of archæology and related sciences, thus attracting students from all parts of the world. A few miles west of the park, on the edge of Montezuma Valley, are the Aztec Springs ruins, which have been deeded by Mr. Henry Van Kleeck, of Denver, to the Federal Government for a national monument. As the name Aztec is a misnomer and often confused with the ruin near Aztec, Mexico, it has been proposed to call this monument Yucca House National Monument. The Yucca plant grows abundantly there, and the name is commonly used by the Indians.

Grand Canyon National Park.—It is interesting to know that the first bill to make the Grand Canyon a national park was introduced June 5, 1885, by Senator Benjamin Harrison, of Indiana. The Grand Canyon has been a national monument since 1908 and has been administered by the Forest Service of the Department of Agriculture. By act approved February 26, 1919, this wonderful area was elevated to national-park status under the Department of the Interior. As there was no field organization ready, the administration of this park was not taken over by the National Park Service until August 15, when an acting superintendent was appointed. A ranger force was speedily established and the organization is now in full working trim.

The imperative needs of the park are roads and the development of a comprehensive trail system. Chalets and camps should be constructed on the north rim of the canyon and other places, as well as on the south rim. Automobile tourists are increasing in numbers, and suitable camp sites, including garage and repair-shop facilities and tourist supplies, will be laid out and developed as quickly as possible. One of the problems is the securing of water which, on the south, rim, is at present brought in by railroad from Del Rio, about 125 miles distant.

The park area is particularly rich in archeological and prehistoric material, valuable from a scientific standpoint, but is as yet for the most part unexplored.

Travel to the park this year indicated that even with its present facilities its attractions are irresistible and, with the intensive development of the park for the use of the public it will increase by leaps and bounds.

Rocky Mountain National Park.—In 1917 and 1918 Rocky Mountain National Park held the record for tourist travel to the big scenic parks of the West, but this season it takes first place in the entire park system as a tourist resort, passing Hot Springs by 9,000 and reaching a total of 169,492. All of the hotels were incapable of meeting the public demand. With the cooperation of hotels outside of the park adequate accommodations might be provided if guests would stay two or three days, but they came to spend a long time in

the park. Accommodations in and near the park were reserved for the remainder of the season very shortly after they opened. As winter sports are also enjoyed there, it seems destined to become an all-the-year-round park.

The limit of annual appropriations to \$10,000, in force until now, has prevented proper protection to its natural features from fire and other destructive agencies. Legislation repealing this inhibition is, therefore, the most important event of the year in this park, not excepting the gratifying increase in its travel. Larger developments are now possible. Game must be protected in both summer and winter; a machine shop, a stable, a storehouse, and a garage must be erected and equipped; and road, trail, and other machinery and tools be procured. Existing roads must be improved; also numerous trails and several important links in the telephone system. Work on the transmountain road connecting Estes Park and Grand Lake, known as the Fall River Road, is being pushed by the State and will be completed by July, 1920, if labor conditions and weather permit. Outside of the park the State of Colorado is expending large sums of money improving the Big Thompson and South St. Vrain approach roads.

A bill providing for the addition of the Mount Evans region to Rocky Mountain Park was introduced during the last session of Congress. This proposed addition covers 160 square miles, abounds in animal life and has a wide range of plant life. Commercially it is worthless, aside from certain grazing lands which are now, and always should be, preserved as a range for game. Denver is extending its road system to Mount Evans, and has agreed to acquire all the private holdings in the park region necessary for administration and improvement purposes.

Mount McKinley National Park.—Although Mount McKinley National Park was established in February, 1917, as an emergency step in the preservation of the great herds of wild animals of that region, Congress has not yet provided any funds for carrying out the provisions of the organic act. The small appropriation allowed the Territorial government for game protection of the entire area of Alaska does not permit of care of the park. As a game preserve it is almost comparable with Yellowstone National Park, and is in much more danger of the hunter because of its distance from civilization. It is not the policy of the National Park Service to immediately open this park to tourists, the preservation of its animals being of first importance. With the work on the Alaska railroad resumed and soon to reach the vicinity of the park, the menace of unprotected grows more threatening.

Lafayette National Park, Me.—This, the first national park in the East, was until February 26, 1919, administered as the *Sieur de*

Monts National Monument. These 5,000 acres upon Mount Desert Island were first acquired through the efforts of President Emeritus Charles W. Eliot, of Harvard; George B. Dorr, of Boston; and others, and in 1913 offered to the Government. Additional land has been given to increase the area to about 10,000 acres. It has varied natural attractions, besides its location on the ocean front, and is easily reached by rail or motor. •

Mr. Henry Lane Eno, ornithologist of Princeton University, has been placed in charge of the bird life, and Mr. Edward L. Rand, of Boston, secretary of the New England Botanical Society, of the plant life. Mr. Charles W. Johnson, curator of the Boston Natural History Museum, and an entomologist of note, is studying the insect life. These men serve for a nominal compensation.

The congressional appropriation of \$10,000 is being used for protection of its wild life, maintenance of old trails, development of new ones, minor improvements, and surveys for future development. During the coming year ranger camps will have to be established for protection of the wild life, discovery of forest fires, and guidance of visitors. In the season just closed 64,000 visitors came to the park.

Platt National Park.—Lack of funds has prevented more than the bare maintenance of existing improvements in this park. As Antelope and Buffalo Springs became suddenly dry in January, 1918, and have not resumed their flow, the sinking of wells has become necessary. Citizens of Oklahoma have subscribed funds for transporting elk from Yellowstone National Park and buffalo from Niobrara Reserve, and as there are a few deer, numerous smaller mammals and birds, this park has possibilities as a game preserve.

Sullys Hill Park.—This game preserve has been maintained by the Biological Survey since 1915. This year Congress made an additional appropriation of \$5,000 for improvements necessary for the protection of the game and comfort of visitors. A proposed Sunset Highway along Devils Lake and running through the entire park would stimulate travel there.

Wind Cave National Park.—A tremendous increase in travel marked the year's activities at this park, improved transportation facilities and proximity to transcontinental highways being largely contributable. The park has been well maintained; the game preserve therein, which was established in 1912, has 4,160 acres under fence and is prosperous.

Hot Springs Reservation.—The Government had no building site at Hot Springs that seemed suitable from the standpoint of convenience and economy for the free bathhouse and new administration building, funds for which had been appropriated by Congress—\$140,000 from the Treasury and \$50,000 from the revenue fund.

When a location was discovered that would meet requirements the citizens of Hot Springs purchased the site (block 82), and title to the same is expected to be transferred to the United States as soon as legal processes will permit. The building fund has been reappropriated by Congress and made available for the fiscal year 1920.

Instead of a new administration building, the present structure will be remodeled to harmonize with the other buildings. Three new bathhouses will also be erected on the reservation front to replace the present Magnesia, Ozark, and Lamar bathhouses, ordered to be demolished at the end of this season. These will be built at the expense of the lessees.

Caring for the indigent people who come to Hot Springs for treatment is still an important housing problem. The citizens of the city have rendered a national service in assisting this class of visitors; but this call of humanity should also have a national response.

This park is growing rapidly in popularity, over 160,000 persons having visited it in the course of the year. The number of paid baths was 729,997, an increase of 25,022 over 1918. Total receipts for 1919 were \$346,974.46, a gain of \$14,183.34 over 1918. Net profits, however, decreased somewhat, due to the greatly increased cost of operation. The 1919 season profits were \$127,476, while for 1918 they were \$127,911. The Government free bathhouse supplied 87,040 baths, the Leo N. Levi Memorial Hospital, 5,445. Altogether there were 824,326 baths taken at the reservation during the season, an increase of 21,501 over last year.

Spring flowers approximating 15,000 bulbs were planted last December in certain sections of the reservation under the supervision of a landscape architect and afforded pleasure to the winter visitors. The effort made during the consideration of the last sundry civil bill to change the name of this reservation from Hot Springs Reservation to Hot Springs National Park was unsuccessful, but another effort will be made to present the merits of the proposal to Congress.

Lassen Volcanic National Park.—Although made a national park by Congress in 1916, this area is still administered by the Department of Agriculture, no funds having been provided for the National Park Service to assume control. A certain amount of grazing has been permitted, which has been entirely in the hands of the forest rangers. An office should be established and existing improvements maintained and others arranged for, unless it is the intention of Congress to no longer consider it as a part of the national park system, in which case it should be withdrawn and made a national monument. It has been suggested that in the park-to-park highway plans a fascinating tour could be made from Crater Lake National Park to Yosemite National Park by way of Klamath Falls, the lava beds, Lassen Volcanic National Park and Lake Tahoe. During the past

two years Lassen Peak has been quiescent, the last eruption observed being that of December 3, 1917.

Hawaii National Park.—Although no funds for the administration of this park have been available, the small appropriation made by Congress for inspection and continued negotiations for acquisition of private lands were effectively utilized, the Director of the National Park Service making a personal investigation of the park last spring. All lands on the west side of Kilauea Crater belong to the Government, but are wholly unfit for development as camp or hotel sites because of the noxious fumes. The lands not affected by these fumes are held in private ownership and are the areas necessary for park purposes. Before any appropriations for the improvement of Hawaii National Park can be made the private holdings necessary for the administration and operation of the park must be secured, together with the rights of way for roads and trails. An inhibition in the organic act establishes this situation. All private holdings in the Mauna Loa Park area have been acquired, and at the first opportunity the survey of a road to connect the Kilauea area with the summit of Mauna Loa will be undertaken. The Maui Chamber of Commerce has built a comfortable concrete rest house in the Haleakala Park area. The volcano of Kilauea has been quite active during the year.

Zion National Monument.—This monument is proposed as a national park, and as soon as this is accomplished certain extensive improvements should be made. Utah has continued its work of constructing permanent improvements on the highways leading to the monument, and if the suggestion to develop Arrowhead Trail from Salt Lake City to St. George is carried out, travel to Zion National Monument will increase greatly. Figures show that more people visited the monument this year by motor than by rail. Prehistoric dwellings have been discovered during the past summer, located only 4 or 5 miles from the entrance to Zion Canyon.

Muir Woods National Monument.—A water system which includes a reservoir has been installed. Mr. William Kent, who in 1908 donated to the Federal Government this tract, is now arranging to convey to the Government another tract of beautiful forest land, for the purpose of enlarging this monument. This tract will include Steep Ravine, which is not far from the Pacific Ocean. In event it is decided to exclude automobiles from these woods it will be necessary to construct an adequate parking space immediately below the reservation, which the owner has tendered for use as a parking area. This arrangement will offer increased advantages as a camping and picnic ground to visitors. Trails, both for use of visitors and as fire-patrol routes, are needed, also a cottage for the custodian.

Chaco Canyon National Monument.—Excavation and restoration of some of the ruins of this monument are being undertaken by the Smithsonian Institution, the School of American Research, and the Royal Ontario Museum of the University of Ontario. A permit has been granted to Dr. Clark Wissler, of the American Museum of Natural History to conduct archaeological investigations at the Pueblo Bonito. The building of the dam and other work necessary to restore the ancient but comprehensive irrigation system will be done by the National Park Service.

Gran Quivira National Monument.—A proposal has been made to extend this monument to include the adjoining tract with the School of American Research purchased from private holders for purposes of preservation and scientific study. Some excavations are in progress by the School of American Research.

Petrified Forest National Monument.—Situated near both a trans-continental railroad and an automobile highway, this monument was visited this year by a large number of travelers. The improvement and repair of a section of the highway through one of the principal forests was the chief work done during the year. Besides the maintaining of good roads, a bridge is needed over the Rio Puerco between Adamana, the railroad station of the monument, and the north line of the reservation. A ranger is needed to prevent depredations.

El Morro National Monument.—The problem connected with this monument is the protection of the historic inscriptions from vandalism. Due to the work done on the Grand-Inscription Rock Road, the State of New Mexico is improving the Ramah-Gallup Road. The marking of trails, placing of warning signs, and opening up of the spring at the base of the rock for visitors, are other improvements borne in mind for early attention. Improvement of roads is bound to bring larger numbers of visitors.

Tumacacori National Monument.—Although established in 1908, not until this year were funds available for repairs on the old mission building. Mr. Frank Pinkley, custodian of the Casa Grande National Monument, who was last year made custodian also of Tumacacori National Monument, without additional compensation, directed numerous repairs on the structure. In this work Mr. Pinkley was assisted by the Chambers of Commerce of Nogales and Tucson, Ariz., and the archaeological department of the University of Arizona, the latter headed by Prof. Byron S. Cummings. These institutions also subscribed funds for a portion of the restoration work.

Dinosaur National Monument.—Continued investigations and excavations of this monument are being carried on by Dr. W. J. Holland, of Carnegie Institute of Pittsburgh.

Casa Grande National Monument.—Considerable important but inexpensive improvement work was accomplished here during the

past year, namely, the clearing of débris and growth of brush, the building of a well, and the providing of picnic grounds, and parking areas for automobiles. The archaeological work undertaken consisted of preparation for investigations of these buried ruins. The study of an elliptical mound leads to the conclusion that the building within was used as a stadium by the ancient inhabitants of the village.

Navajo National Monument.—Work of repairing Betatakin (Hill-side House), a remarkable example of cliff dwelling, was completed last year, under the management of Neil M. Judd, of the National Museum, as field officer. These ruins are to Arizona what the ancient villages of Mesa Verde are to Colorado; and, like the latter, will continue to draw an increasing number of visitors each year. The task of restoring these historic ruins is not difficult, and is a matter of great importance.

Montezuma Castle National Monument.—This monument is in poor condition, and repairs should be undertaken to prevent further deterioration. A resident custodian is needed, but only a nominal sum is available for his services. There is considerable public interest in this monument.

Katmai National Monument, Alaska.—The four expeditions of the National Geographic Society to this region in 1918, which were followed this year by the largest exploring party yet sent out by this society to the region of Mount Katmai and the neighboring valley of Ten Thousand Smokes, more than justifies the creation of this natural wonder area into a national monument. The scientific harvest was unexpectedly large; and, as thousands of feet of film were brought back, the public will have an opportunity to become acquainted with the scenic wonders of this unique region. The discovery of an abundance of fish and game increases the qualifications of this monument as a national park of the future.

Devils Tower National Monument.—The road leading through the monument to the base of the tower was repaired, and the spring at the base of the monument developed to provide drinking water for campers and tourists visiting this natural curiosity.

Lewis and Clark Cavern National Monument.—Because of its inaccessibility it was thought best not to open this cave to the public until it has been made easier of approach and funds have been made available to compensate a resident custodian. This is necessary to prevent depredation. It is under the supervision of the superintendent of Yellowstone National Park.

Shoshone Cavern National Monument.—The trail to Forst's Cave in this monument was finished and offered numerous tourists an opportunity to visit this cavern. Its attractions will furnish an interesting side trip from Cody or the eastern approach to Yellowstone Park.

Sitka National Monument.—Of great interest to Alaskans was the repair of the 18 totem poles on the monument. The highest of these is 60 feet. In addition, seats were placed at prominent points on the island commanding good views of the particularly numerous scenic attractions of the neighborhood. The monument is located only 1 mile from Sitka.

Other national monuments.—Nothing of particular note has transpired in or near these areas; they either do not require extensive improvement or are not susceptible of development except at great expense. These reservations are the Pinnacles National Monument, California; Natural Bridges and Rainbow Bridge National Monuments, Utah; Colorado National Monument, Colorado; Papago Saguaro National Monument, Arizona; Capulin Mountain National Monument, New Mexico; and Verendrye National Monument, North Dakota.

THE TERRITORIES.

Since the transfer under Executive order of July 15, 1909, of the supervision of affairs in Porto Rico to the Insular Bureau of the War Department, the former Territories of New Mexico and Arizona have been admitted as States, and there now remains under this department the supervision of but two Territories—Alaska and Hawaii.

ALASKA.

In the report of the governor for the fiscal year ended June 30, 1919, a strong plea is made for the withdrawal of governmental restrictions on development and for assistance in opening up the Territory to more extended commercial activity. The governor expresses the appreciation of the Territory for what has been done heretofore, but urges still greater assistance so that Alaska can be placed on a greater revenue producing basis. In particular, he draws attention to the lack of Territorial police protection, the closing of industries due to high freight rates and the inadequacy of appropriations.

During the year the Territory has suffered from flood, fire, famine, sickness, and death. Floods have caused great destruction in Seward, Juneau, and Nenana; fire has wiped out a large part of the business section of Fairbanks and, due to the epidemic of influenza, a large proportion of the native population of the Seward Peninsula received relief through Territorial agencies.

The most serious of these disasters has been the scourge of influenza. Following the lines of steamer travel, early in October, influenza broke out in practically all the coastal towns. Travel to the interior was stopped and so escaped an outbreak there. Had the epidemic reached the native and white settlements of the Yukon, the

mortality would have undoubtedly been high, as pneumonia is very fatal in the intense cold.

It is estimated by the assistant commissioner of health for the second division and the officials of the bureau of education that there have been 1,500 deaths, chiefly among the natives on the Seward Peninsula and vicinity. Particularly in Nome and on the peninsula was the epidemic most severe. Whole villages of Eskimos lost their entire adult population. The bureau of education, in charge of the natives of Alaska, was powerless to render much assistance on account of a lack of funds. The governor was asked to take charge of the situation. Medical relief was given where possible, destitution was relieved, and the orphan children gathered up and placed in institutions until appropriations should become available for their permanent care. The Public Health Service rendered aid to a limited extent in the matter of employing physicians and nurses. After the worst of the epidemic was over the American Red Cross lent some financial assistance and sent nurses and physicians north on the naval collier *Brutus*. The bulk of the authorizations, however, were unprovided for. The burial of dead natives alone cost approximately \$20,000. A bill was introduced in the Senate appropriating \$100,000 for Alaskan relief and passed that body but failed in the House. Items attached to the sundry civil and deficiency bills also failed of passage in the House. As a last resort, the governor appealed to the Territorial legislature and received an appropriation from its treasury of \$70,000 for the relief of the native wards of the Federal Government and \$23,000 for whites—this in addition to some \$18,000 or \$20,000 already expended from various other Territorial funds.

Two hundred and thirty-eight orphans, so far reported, are practically all that are left of an Aleut and half-bred population of between 800 and 1,000.

Consolidation of governmental authority.—Attention is drawn to the great confusion existing in Alaska over conflicting departmental authority. There are as many as five different organizations building and maintaining roads on small appropriations; fish canneries must deal with three different departments; game animals are under the jurisdiction of the Department of Agriculture, while fur-bearing animals are under the Department of Commerce; and the settler on forest reserves is always faced with delay on account of the dual authority of the Department of Agriculture and the Department of the Interior. Birch wood, needed in the manufacture of furniture, may be exported from forests, but not from public lands, where the best stands are found. There are reservations and withdrawals administered by no less than seven executive departments. The governor advocates the centralization of all possible authority in the Department of the Interior and then the further centralization of all

bureau authority in Alaska itself, thus making an effective government, responsible to but one chief. There could be then but one territorial budget and one overhead administrative organization.

Police protection.—The great need of the Territory is police protection; there are 4 United States marshals and 55 deputies, including the office deputies. The marshals are technically process-servers and a preventive force. There are 30 or 35 wardens of various bureaus. The governor recommends that all police power be consolidated in the establishment of a uniformed constabulary, patterned after the Pennsylvania Constabulary or the Royal Northwest Mounted Police of Canada. The officers should be given the powers of justices of the peace. Two hundred men of a constabulary scattered throughout the Territory, with travel equipment suited to their particular locality, could perform all needed police work. They would be available not only for police duty, but as quarantine officers in case of epidemic and for rescue service. At present there is a battalion of troops in Alaska, which could be withdrawn and a constabulary substituted therefor.

Naval patrol.—On account of the beneficial results of the former naval patrol, the governor requested that it be continued throughout the year 1919. The gunboat *Vicksburg* and the submarine chasers were returned to Alaskan waters in May and have been most energetic in their activities. The *Vicksburg* rendered splendid service in the Aleutian Islands and in the vicinity of Bristol Bay during the outbreak of influenza in May and June of this year. The *310*, stationed in Prince William Sound, quieted what bid fair to be a serious disturbance between the white and native fishermen at Yakutat, and the *309* has rendered similar service at Klawock. At present the patrol is taking active steps to suppress fish piracy, which has been engaged in more than ever before.

There should constantly be stationed at Juneau a naval or Coast Guard vessel, available for rescue work in case of shipwreck and for cooperation at all times with the Federal and Territorial authorities; during the summer season there should be at least four of the smaller craft on constant duty. So far the results have been invaluable, particularly in the absence of other police power.

Population.—During 1918 the population of Alaska reached its lowest ebb. Vessels reporting to the customs showed an excess of departures over arrivals of 9,909 persons. At the close of the calendar year 1918, taking the customs-house figures into consideration with the census of 1910 and the vital statistics available, the white population barely exceeded 30,000. The governor believes that during the years of exodus (1916, 1917, 1918) fully 10,000 additional people left on small craft, Government ships, transports, and other unreported boats, so that the actual population probably did not ex-

ceed 20,000. The number of persons voting at the election of 1918 seems to bear out this hypothesis. For the first six months of 1919 the excess of arrivals over departures, as reported to the customs, was 11,588, but this figure includes a great number of cannery employees, perhaps five or six thousand, who return to the States at the close of the fishing season. The governor estimates the white population at the end of the fiscal year 1919 to have been about 32,000.

Mineral production.—The value of the mineral output of the Territory in 1918 is estimated at \$28,253,961, a decrease of almost \$12,500,000 from the value in 1917 and the smallest since 1914. The decrease was chiefly in copper and gold and was due to a shortage of labor and ships and high cost of mining. There was an increase of more than 60 per cent in the production of mineral fuels and a slight increase in chrome ore; the only new item among mineral products in 1918 is palladium. Since 1880 Alaska has produced gold, silver, copper, and other minerals worth more than \$418,000,000.

Alaska mines produced gold to the value of about \$9,480,952 in 1918, compared with \$14,650,000 in 1917. The total value of the gold mined in the Territory is now about \$302,000,000, of which \$213,000,000 has been from placers. In 1918 about 69,224,951 pounds of copper was produced, valued at \$17,098,563. The production in 1917 was 88,793,000 pounds, valued at \$24,240,000. The total copper produced to date is 497,786,565 pounds, valued at \$105,743,033. The value of lesser mineral products in 1918 was as follows: Silver, \$847,789; coal, \$411,850; tin, \$118,000; lead, \$88,088; miscellaneous metallic products, including chrome ore, tungsten, palladium, platinum, and antimony, \$96,100; and miscellaneous nonmetallic products, including petroleum, marble, gypsum, and lime, \$120,619.

The governor draws attention to the fact that mining in Alaska has never before been conducted under such adverse conditions. The gold placers, heretofore the backbone of the industry, are the principal sufferers. Wages, costs of equipment and supplies, high rates of transportation, shortage of labor, together with the depletion of the known rich deposits, have all conspired to reduce not only the production of placer gold, but have also prevented contemplated development of the lower grade deposits. For similar reasons, the great low-grade lode mines of the Gastineau Channel have not been able to operate at any marked profit, although all modern devices for reducing costs are being employed.

Copper.—Owing to the lack of transportation during 1918 and governmental demands during the war for the higher grade copper ores, practically none of the low-grade copper mines were enabled to continue normal shipments, to the great distress of the operators.

During the first six months of 1919 the low price of copper was another deterrent feature.

Coal.—In the matter of coal, once more transportation becomes a prime factor. There must be an export outlet; it is probable that trans-Pacific coal-burning ships will find it advantageous to establish a coal supply in the Aleutian Islands not far from the "Great Circle" sailing routes between Puget Sound ports and the Orient. A naval base in Alaska will demand coal in quantity, which can best be supplied from our coal fields. The opening up of the coal fields and their connection with rail and water transportation will eventually result in the building of a smelter on Prince William Sound whereat all the ores of the district can be reduced. When this happens, many of the lower grade mines, not now workable to profit, will become active producers.

Petroleum.—It seems probable that Congress will enact laws at this session which will permit the development of oil fields which are known to be of value. Under existing law, all oil fields are withdrawn from either entry or lease. It is noted that the oil production and consumption curves have crossed and, if for no other reason than to help reduce the exorbitant prices now paid for oils, every encouragement should be held out to the developers of the fields.

United States Geological Survey.—A suboffice of the United States Geological Survey was opened at Anchorage on July 1, 1918. Its function is to maintain headquarters throughout the year for a resident geologist to work on special problems connected with the mining industry of the region and also to serve as a center from which to distribute survey publications and maps and to collect mineral statistics. The establishment of this office marks the further endeavor of the department to assist in the industrial development of the Territory and should become an important factor in the expansion of mining, more particularly along the lines of the Government railroad.

The Alaska Experiment Station of the United States Bureau of Mines at Fairbanks is one of ten similar stations conducted by the bureau throughout the country, the others being located in different mining States. The object of the station is to render every possible assistance to prospectors, miners, and operators; to conduct experiments and disseminate information with a view to increasing efficiency, preventing waste and safeguarding working conditions in mining. The establishment of the station will result in undoubted good to the Territory and is appreciated.

Fisheries and fur-bearing animals.—The fishing industry has now become probably the most important industry of coastal Alaska. Canneries, salteries, cold storage plants are springing up on every hand, but it is feared that the enormous catches of late years will

soon result in a noticeable depletion of the fisheries. There have always been lean years and fat years, but the lean years are becoming more lean and the fat years not so fat. Attention has been brought by those not particularly interested in the conservation of our sea resources to the fact that more and more fish are being yearly exported, but they do not draw attention at the same time to the greater number of fishing devices, the larger and more numerous craft engaged in the trade, the deadly floating trap and the practically uncontrolled stream fishing. 1918 was a banner export year.

The salmon pack for 1919 will probably not exceed 50 per cent of that of 1918. Streams which a few years ago teemed with spawning salmon, now appear almost barren.

The governor favors the transfer of the entire conduct of the fisheries to the Territory, so that governing laws may be enacted by men familiar with local conditions. The money available for the work of the Bureau of Fisheries is so inadequate to the purpose that even the limited number of boats and men employed can not operate throughout the entire season. As a consequence, laws and regulations supposed to control almost every operation are continually being violated by both cannery men and independent fishermen.

If the transfer of the fisheries to the Territory can not be effected, the governor advocates a most liberal appropriation for the protection of Alaska's fisheries and this can be done without loss to the Government, as the revenue derived by the Federal Government from the sale of seal and fox from the Pribilof Islands, from confiscated beaver and marten skins, from by-products of the seal rockeries, are many times in excess of all moneys spent on the fisheries in Alaska, and as additional protection is afforded, so will additional revenues be collected.

Starting with the month of June, the robbing of fish traps and the intimidation of watchmen constituted a menace to cannery operations. Apparently a well organized conspiracy existed for the illicit brailing of traps and for the disposal of the plunder. It was estimated that at least twenty boats were engaged in the unlawful practice. After considerable delay, during which time the fish pirates were particularly active, authority was received from Washington to proceed energetically. Launches and special deputies were employed and several arrests were made. The Territory, by extending assistance to the Bureau of Fisheries, was able to obtain needed evidence. The naval patrol was actively engaged at all times and rendered valuable preventive service. Fish piracy, for this year, at least, has been broken up.

In the session of the territorial legislature held in the spring of 1919, bills were passed providing new and increased taxation upon fisheries products, creating the territorial fish commission, pro-

hibiting the pollution or obstruction of salmon streams, and establishing the office of labor commissioner, among the duties of which is the inspection of canneries and fishery establishments in regard to sanitary aspects of their operation as affecting laboring classes.

In the fiscal year 1918 there were released from the privately owned hatcheries 23,712,000 red salmon fry, for which, at the rate of 40 cents for each 1,000 fry, the owners were entitled to a rebate of \$9,484.80 in Federal license taxes on canned product.

In the season of 1917-18 the total number of young red, or sockeye, salmon liberated was 90,390,200, of which number 66,678,200 were released from Government hatcheries. In the calendar year 1918 the take of red, or sockeye, salmon eggs at Government stations was 101,981,000 and by privately owned hatcheries 40,020,000. In the same period there were also taken 10,062,000 humpback-salmon eggs by Government hatcheries and 3,660,000 at one of the other hatcheries.

The number of persons employed in the fisheries in 1918 was 31,213. Of these, 17,693 were classed as whites, 5,251 as natives, 1,509 as Japanese, 2,734 as Chinese, 1,338 as Filipinos, 1,709 as Mexicans, and 979 as miscellaneous. The total number in 1917 was 29,491, or 1,722 less than in 1918.

The total investment in the fisheries in 1918 was \$73,764,289, of which \$63,901,397, or approximately 86 per cent, was invested in the salmon-canning industry. The investment in 1918 was greater than in 1917 by \$18,826,740. Of the 1918 investment, approximately \$34,500,000 was in southeastern Alaska, \$14,250,000 in central Alaska, and \$25,110,000 in western Alaska.

The total value of fishery products in 1918, exclusive of aquatic furs, was \$59,099,483; the value of the 1918 products exceeded by \$7,632,502 that of 1917, which was \$51,466,980.

A very material increase occurred both in quantity and value of products in the salmon industry in 1918. As in previous years, the value of the output was several times that of all other fishery products combined. In 1918, for the first time salmon were taken commercially to a considerable extent in the Yukon River.

In 1918 the total number of salmon taken was 101,454,688. The take by species was as follows: Coho, or silver, 2,911,681; chum, or keta, 14,160,818; humpback, or pink, 48,316,362; king, or spring, 727,762; red, or sockeye, 35,338,065. The total take in 1917 was 92,600,495, or 8,854,193 less than in 1918.

The value of the output of canned salmon in 1918 represented about 95 per cent of the value of the total products of the salmon industry. The investment in the salmon-canning industry amounted to \$63,901,397, of which \$28,971,126 was in southeastern Alaska, \$11,960,681 was in central Alaska, and \$22,969,590 in western Alaska. The total investment in 1917 was \$46,865,271, or \$17,036,126 less

than in 1918. The number of persons engaged in 1918 was 26,502, an increase of 3,152 over 1917.

The halibut industry dropped from second to third place in 1918, the value of the product being exceeded by that of the herring industry. In 1918 the investment in the halibut industry was \$2,607,792; in 1917 it was \$2,200,987, or \$406,805 less. The number of persons employed in 1918 was 1,186. The total production of halibut credited to the Territory was 13,869,706 pounds, valued at \$1,667,686.

In 1918 there was a great expansion in the herring industry as a direct result of the exploitation work of the Bureau of Fisheries in 1917 to introduce the Scotch-cure method. This work also indirectly stimulated the operations of those who continued to use the Norwegian method. The output of herring was second in value only to that of the salmon industry in 1918. In 1918 the investment in this industry was \$1,802,817, as compared with \$562,002 in 1917, a gain of 220 per cent. The number of persons employed was 884, and the value of products was \$1,819,538; the value of the output in 1917 was \$767,729.

Other industries are the mild-curing and pickling of salmon, the cod, sablefish, whale, and shark fisheries and the packing of clams, shrimps, etc.

Fur seal service.—Commercial killing of fur seals was resumed on the Pribilof Islands in the season of 1918. There were taken on St. Paul Island 27,503 sealskins and on St. George Island 7,387, a total of 34,890 skins for the calendar year of 1918.

Two sales of dressed, dyed, and machined fur-seal skins from the Pribilof Islands were held at St. Louis in 1918. On April 22, the number of skins sold was 6,100, and the total price bid was \$271,945, the average per skin being \$44.58. At the sale on October 7, the number of skins disposed of was 2,000, and the total price bid was \$103,440, an average of \$51.72. The total number of skins sold during the year was 8,100, and the total amount bid at the two sales was \$375,385.

Another census of the fur-seal herd was taken in 1918. The results showed a substantial increase in the size of the herd over the previous year, and were in keeping with the general upbuilding of the herd since the cessation of pelagic sealing several years ago as the result of the North Pacific sealing convention, effective December 15, 1911. A total of 496,431 seals were enumerated.

Territorial fish commission.—The territorial legislature of 1919 provided for the creation of a fish commission and the establishment of a hatchery. For this purpose the sum of \$80,000 was appropriated. Part of this appropriation is being utilized in clearing obstructions from salmon spawning streams. All employees will be

appointed ex-officio Federal fish wardens to assist in maintaining the fishery regulations and to secure better cooperation with the Federal authorities.

Agriculture.—Many parts of Alaska contain land on which farming can be successfully followed, provided markets can be procured for the products. In the Tanana Valley farming has long since passed the experimental stage. In the Matanuska Valley splendid results, particularly with vegetables, have been obtained. In southeastern Alaska vegetables and the small berries are grown. Particularly near Fairbanks does one find well laid out and productive farms. There are 93 homesteads in the district, totaling 22,613 acres.

A small flour mill has been bought for the Department of Agriculture experiment farm, and many of the farmers are availing themselves of the opportunity of grinding flour from their own wheat. In a few years the Fairbanks district will be enabled to furnish wheat for the entire Yukon Valley.

The governor suggests that legislation be passed to enable the Department of Agriculture to distribute beef and milch stock to the farmers on long-time payments.

To assist the farmers, good roads should be furnished. The condition of both the Territorial and Federal road funds is such that the entire appropriations are now needed for maintenance and little new work can be undertaken until larger sums are available.

Public lands.—The records of the Surveyor-General's office show that during the fiscal year ending June 30, 1919, 18 townships, whole and fractional, were approved; 11 on the Seward meridian and 7 on the Fairbanks meridian.

There have been surveyed in Alaska, to this date, 134 townships, whole and fractional; 82 on the Seward meridian, 39 on the Fairbanks meridian, and 13 on the Copper River meridian.

During the present season surveys are being made along the Cook Inlet coast of the Kenai Peninsula, north of Kachemak Bay, and in the Chilkat Valley in southeastern Alaska.

The governor recommends the reorganization of the general land office in Alaska so as to have one office in the Territory that can speak authoritatively. In the present system every land claim becomes practically the subject of consideration by four different branches of the bureau. The governor suggests that this can be done in one of several ways; as a start the office of the surveyor general can be abolished with a considerable saving to the Government, and his duties delegated to either the supervisor of surveys or to the chief of the field service, to be handled with a minimum office force. The surveyor general is ex officio secretary of the Territory. At least these two offices should be separated and the latter office be filled

either by presidential appointment or made elective. There is nothing in common in the two positions.

National forests.—There are two great national forests in Alaska, the Chugach, comprising 5,417,852 acres, and the Tongass, comprising 15,449,717 acres. On May 2 and August 16, 1918, 199,680 acres were temporarily withdrawn from the public domain near Lituya Bay.

The governor does not believe in national forests for Alaska. He states that it is true that a certain amount of money is spent on roads and in cooperative agreements for roads, but if the same provisions could be made to cover public lands, the whole country would be better off. Those interested in the possible manufacture of pulp tell him that the industry would have undoubtedly been established in Alaska, if definite terms covering a period of years could have been arranged for, and if the water powers were not subject to a lease revocable at any time. In his last annual report, he suggested that there is no function performed by the Forest Service which could not be performed by the General Land Office.

The total receipts for the Tongass and Chugach National Forests for the fiscal year ended June 30, 1919, were \$102,813.71. The total cost of administration of the two forests for the same period was \$43,454.14.

The total number of applications received for forest homesteads on the Tongass Forest is 245, eight of which were received during the past fiscal year. The total number of applications received for lands within the Chugach National Forest is 407, only three of which were received during the past fiscal year. Patent survey is made by the Forest Service free of charge for all national forest homesteads just as soon as the applicant has complied with the homestead law.

There are at present 580 occupancy permits in effect on the Tongass Forest. Among the many users are 55 canneries, 69 cabins for which no rental is charged, 4 cold-storage plants, 320 residences for which an annual nominal rental fee is charged, 24 salteries, 8 sawmills, 1 whaling station, and 7 fox ranches. There are 159 occupancy permits in effect on the Chugach National Forest covering free agricultural uses, canneries, fox ranches, salteries, residences, herring pounds, etc.

On the Tongass Forest there were a total of 429 timber sales made, covering 42,295,000 board feet of saw timber and piling, and 38,403,000 board feet were actually cut during the fiscal year. On the Chugach there were 93 sales, covering 5,349,650 board feet; 6,360,990 board feet of saw timber and piling were cut during the fiscal year. In addition to the timber sold on the Chugach the Alaskan Engineering Commission cut approximately 5,758,000 board feet under free use.

The area of the Chugach Forest was reduced by 307,800 acres. This elimination was effected through presidential proclamation dated April 16, 1919. The areas eliminated include a strip of land 3 miles deep from Kachemak Bay to the Kasilof River, and the larger portion of the surveyed land in the vicinity of Anchorage, containing a considerable portion of land suitable for agricultural purposes, as determined by an extensive reconnoissance survey conducted by the Forest Service.

National park and national monuments.—Alaska has one national park (the Mount McKinley) and three national monuments. The park, of approximately 2,200 square miles, has as the central attraction Mount McKinley, 20,300 feet in elevation, the highest known mountain in North America. Its northern slopes embrace some of the greatest breeding grounds of game in Alaska, where it is no unusual sight to see herds of woodland caribou of from 200 to 1,000 animals, and sheep in bands of several hundred, while moose and bear are found in more limited numbers.

The Sitka National Monument, near Sitka, the old historic capital of Alaska, lying along Indian River and the bay, is one of the most beautiful spots in all Alaska. The reservation embraces 57 acres and contains a number of splendid totem poles which, through neglect, were rapidly falling apart. A small allotment of funds by the National Park Service has enabled the custodian to repaint and repair those poles which were in the worst condition. These totems it will be impossible to replace and they should be carefully guarded.

The Katmai National Monument, a reservation of approximately 1,700 square miles, surrounds the volcano, Mount Katmai, which "blew its head off" in 1912 and deluged the surrounding country with ashes.

The monument at Old Kasaan embraces 38.3 acres and contains some wonderful totems which, unless cared for, will soon disappear. The monument, which is under the Agricultural Department, is entirely neglected and seldom visited.

The Government railroad.—This project is covered under the heading "Alaskan Engineering Commission," page 53. The governor makes most favorable comment thereon and urges that appropriations therefor be made available so that uninterrupted progress can be made on construction. He states that it is very probable that even after completion the railroad will not immediately operate at a profit, but the deficiency will be more than offset by the new and taxable industries established along the route. Alaska has proved immensely profitable to the Government along the lines of established transportation. The country along the railroad will prove no exception.

Alaska insane.—Under a contract with the Secretary of the Interior the legally adjudged insane of Alaska are cared for at the

Morningside Hospital near Portland, Oreg., the contractor being the Sanitarium Co. The present contract expires on January 20, 1920. A new five-year contract with the same company has been executed, at a price of \$41.25 a month per patient, which, in view of the rapid rise in the price of supplies, equipment, wages, etc., will be entirely inadequate. Twice since the signing of the armistice it has been necessary to raise salaries. In addition to the hardships encountered by the contractors due to high costs, beginning January 1, 1920, under a ruling of the labor commissioner for Oregon, three shifts will be required in the nursing and attending staffs. Steps should be taken to afford relief to the contractor so that the inmates of the sanitarium may not suffer in any manner.

Commerce.—The total commerce of Alaska with the United States for the fiscal year was \$117,018,835, as compared with \$131,767,788 for 1918, or a decrease of \$14,748,953. The more important increases and decreases are as follows: The increase in the export value of sea-food products was \$5,144,171; the decrease in the value of copper shipped was \$5,978,824, while the export of domestic and foreign gold and silver from Alaska for 1919 amounted to \$9,308,119, as compared with \$15,134,879 for 1918, a decrease of \$5,826,760.

On imports from the United States the following increases and decreases are shown: Increase on coal, \$33,835; decreases, lumber, \$212,820; liquors, \$414,755; iron and steel, including hardware, \$4,764,759; breadstuffs, \$461,895. The total decrease in shipments from the United States to Alaska amounted to \$8,736,041.

Imports from foreign countries amounted to \$1,334,403 and exports to foreign countries of \$1,074,367, which, added to the total commerce of Alaska with the United States, make the grand total commerce of Alaska for the fiscal year 1919 reach the sum of \$119,427,605, as compared with \$135,115,025 for 1918.

Transportation.—Chiefly due to war conditions, transportation to and in the Territory during the past year has been in a most chaotic condition. Steamers have been unable to maintain schedules and in many instances have entirely cut out former ports of regular call. A great hardship was worked particularly in many of the districts off the regular lanes of traffic.

The Prince William Sound ports during the winter were intermittently served by the two large steamship companies—the Alaska Steamship Co. and the Pacific Steamship Co.—with three regular ships. These had but small passenger traffic and little northbound freight, although full cargoes southbound, principally of ore.

The industry of the Territory is seriously menaced. As a matter of protection, the legislature of the Territory enacted a law creating a shipping commission, consisting of the governor, the secretary of the Territory, and the treasurer, empowering them to investigate traffic conditions and, if no remedial results can be procured, to

even go to the extreme of establishing a territorial steamship line, it being considered that to protect the industry of the Territory, it might be best to operate such transportation line even at an annual loss.

Federal roads in Alaska.—The Alaska Road Commission, constituted by act of Congress approved January 27, 1905, is composed of three officers of the Army, who report to the War Department through the office of the Chief of Engineers.

The total expended for all construction and maintenance to June 30, 1919, is \$1,920,655.67. Of this amount \$2,920,000, or 59 per cent, was appropriated at different times by Congress, and \$2,000,655.67, or 41 per cent, from the Alaska fund. One thousand thirty-one miles of wagon road, 673 miles of sled road, and 3,223 miles of trail have been constructed and maintained since 1905. Approximately 400 miles of wagon road has a light gravel surface.

The appropriation granted for 1920 is \$100,000, amounting to an allowance of \$20 per mile, which makes it impossible for the commission to take care of the ordinary maintenance, and also makes it necessary to defer maintenance on a great many roads which are of great importance to the people of the Territory.

Territorial roads.—The road law enacted by the last legislature provides for the closest cooperation between the Territory and the Federal road authorities, and when full advantage is taken of the provisions of the law, most satisfactory results should follow.

In addition to roads constructed and maintained through Federal agencies, the legislature appropriated \$375,000 for the biennium ending March 31, 1921. Under the provisions of the new road law, the apportionment to the road districts of the four judicial divisions may be expended under cooperative agreement with Federal agencies.

The Territory has partly constructed and wholly maintains 241 miles of wagon roads and 232 miles of pack or sled trails. Winter trails are staked across the tundra for the safety of travelers and relief cabins are erected where travel is dangerous.

Natives of Alaska.—The governor suggests that an Indian policy for Alaska should consist of, first, the elimination of communicable and hereditary diseases, and, second, training the young in useful trades within the Territory itself. Unless the native is made healthy and decently self-supporting, religious and scholastic education is, to a great extent, waste effort. The governor thinks that it is not demanding too much to ask that the Alaska natives have as much spent on them per capita as do the Indians of the States, and given equal consideration in proportion to numbers, in the establishment and maintenance of schools and hospitals. The Alaska natives will gradually become a considerable factor in the industrial development of the Territory. He draws attention to the fact that in addition to the expenditures by the Bureau of Education, the Terri-

tory is spending annually about \$30,000 for the education of natives and half-breeds.

Alaska native school service.—The schools for native children in Alaska are supported by Federal appropriation under the supervision of the Bureau of Education of the Interior Department. The Territory is divided into five districts, each in charge of a superintendent of schools directly responsible to the chief of the Alaska Division of the bureau, whose headquarters are in Seattle. The Seattle office also functions as a purchasing and disbursing office for the service.

During the past year, 65 schools were maintained with a total enrollment of approximately 3,600, the highest monthly average attendance being 2,750. The enrollments in individual schools range from 12 to 169. Primarily because of the difficulty in securing suitable teachers, 6 of the schools operated the previous year were not opened. In spite of undeniable increases in costs of all kinds during the war, the bureau's appropriation for the education of these children during the past year was but \$215,000, an increase of only \$15,000 over the \$200,000 received in 1907 and each successive year. Obviously the bureau not only must reduce its expenditures for supplies and materials to the lowest possible figure in order to maintain the school system established but is also very much handicapped in attempting to meet the increased salary schedule necessary to the efficiency of the personnel.

The necessity for enlarging the work among the natives of Alaska has annually been set forth in reports to this office. The immediate needs may be summarized as follows:

An appropriation for education of not less than \$350,000 with which to meet the increased cost of operating the present school system and to provide school facilities for districts of Alaska which the bureau has been unable to enter for financial reasons.

A power schooner for use in making delivery of supplies to the stations during the open season of navigation and to be used as a training ship in seamanship as part of the education of young natives in southern Alaska.

Several trade schools in Alaska to enable promising young natives to complete their education under environments to which they are accustomed. Under present conditions, it is necessary for them to enter schools in the States, with the usual result of impaired health and making them unfit to return to their old environments.

A reimbursable fund with which to establish industries in native communities. The success the bureau has already had along this line shows what might be done under proper supervision. The native people can and will repay any loans of this nature, and industrial enterprises among them will not mean competition with the whites, but rather the development of native resources.

Alaska native medical service.—The ideal arrangement, of course, would be to have a sufficient number of small hospitals, physicians, and nurses so that professional care for serious cases would be within reach of all the stations of the Bureau of Education. With an annual appropriation of but \$75,000 this can not be done. Under these financial limitations the bureau has been enabled to establish, operate, and maintain a complete hospital at Juneau of 20-bed capacity, an 11-bed hospital at Kanakanak, Bristol Bay, a similar sized one at Akiak on the Kuskokwim, and small hospitals in charge of a physician and one nurse at Nulato on the Yukon and at Kotzebue. Contract physicians were also employed at Ellamar, Cordova, Hoonah, and Nome. In addition to the nurses employed in the hospitals mentioned above, a nurse was stationed at each of the following places: Metlakatla, St. Michael, and Wales. Such a staff is absolutely inadequate to the requirements of the Territory, as was evidenced during the influenza epidemic which made such terrible inroads on the native population. The natives of Alaska are peculiarly susceptible to epidemics, and not only from a humanitarian standpoint should they be protected, but in the economic interests of the Territory should the native races be safeguarded.

During the present summer a hospital is being erected at Noorvik on the Kobuk River. It will be practically a duplicate of the Akiak Hospital, and will accommodate about 12 patients besides providing quarters for the staff.

An excellent start has been made in the medical work among the natives of southeastern Alaska, which district, however, is but a very small part of the Territory. The Bureau of Education should have an appropriation of at least three times the present one in order to provide for the needs of the natives in other parts of Alaska. Unless their physical well-being is adequately attended to, the educational efforts for the natives are of doubtful permanent value.

Alaska reindeer service.—Until 1892 Alaska had no reindeer. In that year and for 10 succeeding years, 1,280 deer were imported from Siberia. To-day there are in the neighborhood of 125,000 reindeer in Alaska. The primary object of the introduction of reindeer was to make the natives of Alaska economically independent. By a system of apprenticeship a native serves for four years in learning to care for the deer and receives 6, 8, 10, and 10 deer for the first, second, third, and fourth years, respectively. At the end of his apprenticeship he is a full-fledged herder and assumes charge of his herd. After his herd attains sufficient size, he in turn is required to take on an apprentice. Thus the system of distribution among the natives is perpetuated, and any native desirous of owning deer can either acquire them in this manner or can purchase them from another native.

So complete has been the distribution among the natives that at the present time the Government holds title to less than 3 per cent of the deer in Alaska. Seventy per cent are owned by the natives, while 5 per cent are held by the missions in Alaska for the benefit of the natives. The remainder is owned by Laplanders and whites. The Bureau of Education appropriation last year of \$6,000 was used entirely in the completion of the distribution of deer among the natives. Through lack of funds the bureau is consequently handicapped in working out problems in connection with marketing the meat. The industry has now reached proportions where an outside market is imperative and the present area of high meat prices makes this the opportune time. Some efforts along this line have been made by the white owners and the present year should show considerable progress. However, several kinds of diseases have developed. Warble flies infest many of the deer and make the skins practically worthless, and the stock in many herds has deteriorated as a result of inbreeding.

To assist in these and other problems peculiar to the reindeer the Bureau of Education has employed a veterinarian with headquarters at Shaktoolik in the Norton Sound country who will give his entire attention to reindeer matters. This is an immense step in the right direction and it is hoped the bureau may be able to place similar specialists in other reindeer sections and that much good may result to this important industry.

Relief measures.—Biennial appropriations are made by the legislature to cover the following relief measures:

Rescue and relief of lost persons.....	\$10, 000
Pioneers' Home.....	107, 200
Allowances for aged pioneers.....	40, 600
Dependent children.....	12, 000
Relief of destitution.....	15, 000
Total.....	184, 800

The above total does not include an appropriation of \$93,000 and the unexpended balances of other appropriations for relief authorized by the governor during the three epidemics of influenza, 90 per cent of which expense was incurred among the natives and should have been borne by the Federal Government.

Ten per cent of the Alaska fund is expended for the relief of destitution by the United States district judges of the four judicial divisions. This in 1918 amounted to \$21,962.10.

Game and game laws.—Probably due to loss in population, game seems to be on the increase throughout the Territory. Coyotes, however, have worked their way up through British Columbia and have entered Alaska by way of the White River. Wolves are greatly on the increase.

The governor again draws attention to the fact that the game laws are ill-advised and can not be enforced, especially with an appropriation which is entirely inadequate. He suggests that the jurisdiction over the game and fur-bearing animals be transferred to the territorial legislature. The governor entirely approves of the migratory bird treaty, but considers that the open season for killing birds should be advanced in Alaska and the Yukon territory, as practically all migratory birds have left the interior of Alaska by October 1.

"Bone dry" Alaska.—During the fiscal year there were 91 arrests made by the special officers for the suppression of the liquor traffic among the Indians, for violations of the liquor laws, 78 convictions and 13 acquittals. Fines, amounting to \$8,410 were collected and jail sentences aggregating 1,168 days were imposed. Other arrests were made by the marshals of the several judicial divisions and convictions obtained which are not included in the above.

Under an annual appropriation by the Government of \$15,000, there are four special officers for the suppression of the liquor traffic among the Indians employed—one in each of the judicial divisions. To properly enforce prohibition, this appropriation is absolutely inadequate; the distances are too great, the expense of travel too heavy. Very little real whisky is now coming into the country, but the resourceful bootlegger is distilling his own "hootch" in neat stills which can be set up on a kitchen stove. Some of the stills captured are marvels of ingenuity. The product of these illicit stills (commonly known as "White Mule," on account of its color and powerful "kick") is vile in the extreme and most injurious to health. If prohibition is to be thoroughly enforced, there must be more officers for its enforcement and a fund to be expended in detective work.

Aids to navigation.—Owing to the great extent of the coast line of Alaska, with the many islands and indentations, navigation has at all times been difficult and dangerous. Scarcely a year goes by without record of a serious wreck. As fast as money has been made available, new lights and other aids have been installed, each one of which marks some menace to the mariner. Gradually the Lighthouse Service is improving the safety of the coast, but the improvement is being too slowly effected and the money appropriated is not commensurate with the trade demands of the Territory.

Nineteen new lights were established in Alaska by the Lighthouse Service since June 30, 1918. Four lights were changed from fixed to flashing, and 1 gas and bell buoy, 11 buoys of other types, and 3 beacons were established.

The total number of aids to navigation in Alaska, including lights, gas buoys, fog signals, buoys and day-marks, in commission at the

close of the fiscal year ended June 30, 1919, was 459, including 178 lights and 8 gas buoys, representing an increase of 149 lighted aids since June 30, 1910, or over 400 per cent.

The Coast and Geodetic Survey.—The accomplishments of the Coast and Geodetic Survey in making hydrographic and geodetic surveys in the Territory of Alaska during the year for which this report is made, have been materially lessened on account of the fact that considerable of the equipment and many of the officers of that bureau have been assigned to the Navy and the Army to meet the military needs of the Government. The outcome has been that no vessel surveys have been made in Alaskan waters during the year, nor were any geodetic surveys made. The hydrographic surveys were confined to what was accomplished by two wire drag parties.

Mail service.—Great discontent over the mail service in Alaska is manifested on all sides and it is the inadequacy of the service which is hurting Territorial development. Some of the complaints of last year have been satisfied by amended regulations, but mail is still shipped to Alaska as express and freight; the mail clerks are still absent from the steamers, and business requiring action by return mail still languishes. Owing to the fact that freight mail pouches are no longer locked in a mail or express room, it is reported, on reliable authority, that robberies, particularly of parcels, are frequent. West of Seward conditions have been deplorable, owing to the letting of contracts to boats incapable of performing service. For over two months during a severe epidemic of influenza, Kodiak and Afognak Islands were cut off from communication, rendering it impossible to send medical relief.

Alaska fund.—The revenues derived by the Federal Government from business and trade licenses outside of incorporated towns for the fiscal year 1919, amounted to \$280,906.80, as against \$293,161.65 for 1918, a decrease of \$12,254.85. The total revenues received from taxes levied by the Federal Government within incorporated towns, from business and trade licenses, amounted to \$68,229.31, as compared with \$81,101.28 in 1918. The governor recommends that the Alaska fund be covered into the Territorial treasury for expenditure under the direction of the legislature.

Territorial finances.—Taxes collected and other revenues accruing to the Territory are covered into and disbursed from the territorial treasury, the fiscal year of the Territory corresponding to the calendar year. The condition of the territorial treasury for the fiscal year ended December 31, 1918, was as follows: Balance on hand January 1, 1918, \$682,493.11; total receipts from all sources, \$475,450.55; total disbursements under appropriations made by the territorial legislature, \$624,100.85; balance of cash on hand December 31, 1918, \$533,842.81.

At the close of the fiscal year covered by this report there were 15 territorial banks and 3 national banks in the Territory—a loss of 1 during the year. No new banks were established during the year and there were no failures, the loss being occasioned by one of the territorial banks at Nome voluntarily liquidating its affairs.

Deposits in the several territorial banks, at call of April 30, 1919, aggregated \$6,047,543.74, as compared with \$5,974,728.82 under corresponding call of May 8 of the year previous.

Corporations.—On July 1, 1918, there were 258 domestic and 469 foreign corporations transacting business within the Territory, a total of 727. During the fiscal year 1919 there were 17 new corporations formed and 18 foreign corporations registered. There were 33 domestic and 31 foreign corporations dissolved, making a total number of 698 still transacting business, a net loss for the year of 29.

Incorporated towns.—There are at present 17 incorporated towns in Alaska, listed as such with the Secretary of the Territory, but the town organization of Chena has ceased to exist, practically all the inhabitants having moved away and no action has been taken for the last three years to conduct a municipality.

Reports received from 14 of these towns show a total assessed valuation of \$14,195,025. The rates of taxation on the assessed valuation range from 1 to 2 per cent, the average being 1.5 per cent.

Schools.—The public schools of Alaska are administered under both Federal and Territorial laws. The Federal law, known as the Nelson law, provides for schools outside of incorporated towns or incorporated school districts and receives for their maintenance 25 per cent of the Alaska fund. The Territorial laws provide for schools in incorporated towns or districts, one-fourth of the cost of maintenance being borne by the town or district by taxation of real and personal property and three-fourths by the Territory. Territorial laws provide for the establishment of night schools and carry an appropriation for the support of the same. Four communities took advantage of the provisions of the law during the year.

There are 13 schools in incorporated towns and 2 in incorporated school districts, supported in part by territorial appropriation. The averages for the 15 schools, as shown by the table of statistics, are as follows: Average number of teachers, 5.8, with average yearly salary of \$1,279.93 per teacher; average enrollment 130.33; average daily attendance, 100.31; average cost of maintenance, exclusive of teachers' salaries, \$3,970.53. The average cost per pupil was \$87.42, as compared with \$80.14 for the previous year.

For the year 1918-19 schools were maintained in 47 districts outside of incorporated towns and incorporated school districts. The 47 schools employed 60 teachers and had an enrollment of 1,209, as compared with 1,180 the previous year. The average number of

pupils per school was 25.7, as compared with 25.6 the previous year. A total of \$109,650.61 was expended for maintenance, at an average cost of \$2,332.99 per school, as compared with \$2,174.93 for the previous year. The average cost per pupil was \$90.69, as compared with \$84.79.

Territorial legislature.—The fourth legislative assembly convened at Juneau, the capital, on March 3 of this year, and remained in session for the authorized 60 days. Sixty-two laws were enacted. One bill was vetoed by the governor and two failed of approval after the legislature had adjourned.

Labor conditions.—There has been a general shortage of labor throughout Alaska. Mines of all kinds have been working short-handed, resulting in a curtailment of output. The gold mines have been the greatest sufferers, as the operators have not been able to compete for labor as have the copper mines when that metal was in demand.

Wages in all classes of mines compare favorably with wages paid in the States, but with a nation-wide demand, laboring men prefer to work in larger communities, although the opportunities for saving are better in Alaska than almost anywhere else; rents are lower and there are not the temptations to spend.

Selective service.—The operation of the selective-service system in Alaska was carried out with little confusion, under the direction of the governor, assisted by an executive officer, commissioned by the Secretary of War. There were 21 local boards scattered throughout the Territory and four district boards, one for each of the four judicial divisions.

Two thousand two hundred and twenty-three registrants of the class of June, 1917, were inducted and sent to camp, 1,656 of whom were delivered to Alaskan posts. It is estimated that fully 1,500 young men left Alaska and enlisted in the States, either in the Army or Navy and are credited to the States wherein enlistment took place. Many Alaskans are not credited to Alaska in the draft, as a large number of registrants, although they had been in the Territory for years, gave their home address as some place in the States, usually where their parents resided. In consequence, these registrants, when inducted, were credited elsewhere.

Tourist travel.—More tourists have visited Alaska this season than ever before. This is due largely to the closing of trans-Atlantic travel to pleasure seekers and to the well-placed advertising by the bureau of publicity. In fact, travel has been so heavy that returning residents of the Territory have often been obliged to wait for weeks before being able to procure accommodations. The class of tourists has been remarkable. There have been noted publicists, authors.

jurists, musicians, educators, naturalists, and men of world affairs. All have expressed themselves as being astounded at the marvels of scenery, the industries, latent possibilities, and the intelligence and refinement of the population. Some have made investments. All have become ardent supporters of the country.

Public buildings.—The need of a public building at the capital is yearly becoming more apparent. The Federal offices are scattered in various parts of Juneau, in wooden structures, which may at any moment be destroyed by fire. The records of these offices are unprotected, and, if lost, could not be replaced. The office of the governor is housed in a shack, constructed many years ago as an Indian school. The building is unsafe in its present condition, but must continue to be occupied, as suitable quarters can not be procured for the amount appropriated by Congress for rental of office. There is, of course, as in the other offices, the ever-present danger of fire, which, should it break out, will undoubtedly destroy all the valuable archives and books and collection of the historical library and museum. Some of the books are priceless.

Office of the governor.—The office of the governor does not receive the support to which it is entitled. In the face of daily increasing costs the appropriation for salaries of clerks, travel expenses, maintenance of the office and the executive mansion and other contingent expenses for the past two fiscal years has been cut from the prewar allowance of \$7,500 per annum to \$6,000. On December 31, 1918, the entire amount available for contingent expenses had been expended.

The importance of the office is growing every year and the expense must be met from some source. Territorial assistance has been rendered under the excuse that the governor is the executive head of territorial laws. A large part of the maintenance expenses properly belonging to the Federal Government has been borne by the governor personally. Increased salary for the secretary to the governor is asked as well as additional clerical assistance.

Recommendations.—In conclusion, the governor submits a list of the principal recommendations detailed in the body of his report as follows:

Reimbursement of the Territory for money spent for the relief of natives.

Consolidation of all governmental authority possible in the Department of the Interior, thus doing away with conflicting departmental jurisdiction.

Removal of restrictions on export of birch timber from public lands.

Establishment of a uniformed constabulary.

Assignment of naval or Coast Guard ships to continuous duty in Alaskan waters.

Reimbursement of chrome producers for losses incurred while operating under encouragement from the Government.

Restoration of the prewar appropriation of \$100,000 to the Division of Mineral Resources of Alaska, of the United States Geological Survey.

Transfer of jurisdiction over the fisheries to the Territory.

Exemption of Alaskan canneries from the provisional regulations covering the administration of Title XII of the revenue act of 1918, imposing a tax on the employment of child labor.

Assistance to farmers by loan of money and cattle.

Consolidation of authority in local land offices and creation of office of secretary of the Territory.

Restoration of national forests to the public domain.

Appropriation for Mount McKinley National Park.

Increase of contract price for the care of the Alaska insane.

Increased telegraph service.

Increased appropriations for roads and trails.

Increased appropriation to the Bureau of Education for work among the natives.

Appropriations for the reestablishment of musk-oxen in northern Alaska.

Increased appropriations for the protection of game and the suppression of the liquor traffic.

Increased appropriation for the establishment of aids to navigation.

Increased appropriations for coast surveys.

Renewal of mail contract system for the delivery of mail.

Passage of an act covering the revenues now accruing to the Alaska fund, into the territorial treasury.

Amendment of organic act to grant full territorial powers of legislation to Alaska.

Authorization for the construction of a public building at the capital.

Increased support to the office of the governor.

HAWAII.

The report of the governor of Hawaii shows that the financial situation and other conditions have been generally good throughout the Territory during the year ended June 30, 1919. With the rest of the United States the Territory has seriously felt the increased cost of living; a policy, however, of home production of foodstuffs, begun during the war, the lessons of thrift which the war taught, the liberal wages generally paid in various employments and the mild climate of the islands have tended to lessen the hardships resulting therefrom. Sugar and pineapples continued to be the main

crops of the islands. The yield of sugar for the year 1919 is estimated at 600,000 tons, and that of pineapples at 5,000,000 cases.

The future holds promise of a great shipping business for the ports of the islands, in that many of the vessels which will carry freight and passengers on the Pacific Ocean will touch at Honolulu and other harbors. The Territorial government, as well as private business interests are using every effort to make the ports, particularly those of Honolulu and Hilo, attractive in anticipation of this coming traffic.

The governor expresses the opinion that the Territory's borrowing capacity, as prescribed by section 55 of the organic act of the Territory, which now permits the borrowing to a limit of 7 per cent of the assessed valuation of the property in the Territory and in any single year not more than 1 per cent of such assessed valuation, should be increased upon the condition that the extra amount of money provided shall be used only for wharf and harbor improvements. Many of the ships which had formerly called at Honolulu were commandeered for war purposes, causing congestion in passenger traffic and in freight during the past two years. There is a promise, however, that a number of these vessels will shortly be returned to the island trade. On the town side of Honolulu Harbor the Territory is constructing new concrete wharves to accommodate for many years all types of vessels which may call for freight or passengers. To accommodate the trans-Pacific trade, which calls mainly for fuel, water, and supplies, the Territory has acquired title to Sand Island on the west side of the harbor. This island was originally a coral reef covered with water at high tide, but the United States Engineers in their dredging operations pumped material on it raising it to a grade above high-water mark.

On August 21, 1919, Hon. Josephus Daniels, Secretary of the Navy, officially opened the new concrete dry dock at Pearl Harbor, in the island of Oahu. It is 1,001 feet long, 123 feet wide, 35 feet deep, and can accommodate the largest vessel afloat. In addition, there are all the necessary shops for making repairs to vessels, and also a coal dock with storage space for a large quantity of coal.

The business of the Territory is largely agricultural and the bulk of the land most suited to agriculture is in localities deficient in rainfall, making large irrigation projects necessary. Extensive irrigation systems have been developed on the four main islands of the group, and without the water thus supplied most of the larger plantations could not exist. This fact justifies the large expenditures that have heretofore been made in developing the systems that carry water, often through many miles of ditches, tunnels, and pipes from the streams in the rainy sections to the cane fields. Besides the use

of surface streams important developments of artesian wells have taken place, particularly on the island of Oahu. The storage of water in large quantities has not been possible on account of unfavorable topographic features, though there are many small reservoirs. Its water resources are one of the Territory's most valuable assets and should be developed to the fullest extent, so that more land may be brought under cultivation or the land under cultivation may be made more productive.

Comparisons of rainfall and runoff show that only about 30 or 40 per cent of the rainfall reaches the sea by surface streams, evidencing the fact that enormous quantities of water flow from the mountains to the sea in underground channels. The Water Resources Branch of the United States Geological Survey is working in harmony with the division of hydrography of the Territory in the study of surface-water streams as well as in the location and utilization of underground waters.

The organic act of the Territory provides that upon petition of 25 or more qualified citizens the commissioner of public lands shall cause to be surveyed and opened for homesteading any tract of government land desired by the petitioners. Under this law tracts of land are now being opened for homesteading as the general land leases expire. The most recent homestead drawing took place in February of 1919, when approximately 5,500 acres of government cane land at Waiakea, South Hilo, Hawaii, was given out in 183 lots, and 2,242 applicants participated in the drawing for these lots, which is an indication of the eagerness with which homesteads are sought. It is known, however, that a large percentage of the applicants had no desire to become bona fide homesteaders, but took a chance on the securing of a lot for speculative purposes. Furthermore, a much larger percentage of the applicants were not in a position financially to handle a homestead proposition. This was clearly indicated by the fact that of the 183 successful applicants, 50 per cent had to borrow money to make the required payment of 10 per cent on the purchase price at the time of selecting the lots, and a large number did not have the money to purchase a steamer ticket to Hilo.

The Territorial legislature, at its 1919 session, adopted a resolution, which a Territorial commission is to take to Washington in 1920 with a view to having Congress amend the organic act so that land matters can be handled in such a way as to do justice not only to those applying for the land but to the taxpayers of the Territory.

Imports and exports.—The imports for the year ended March 31, 1919, were \$50,743.793, a decrease over the previous year of \$1,057,411. The exports for the year ended March 31, 1919, were \$88,250,021, an increase of \$7,703,415 over a similar period for the previous

year. The following table shows the imports and exports by countries for 1918 and 1919:

Countries.	Imports.		Exports.	
	1918	1919	1918	1919
Australia.....	\$118,443	\$138,289	\$20,284	\$36,141
Other British Oceania.....	71,974	67,944	161,923	106,720
British India.....	834,512	1,372,469		
Canada.....	345,340	431,760	88,856	3,975,840
Chile.....	1,001,089	871,328		
France.....	4,304	1,822		
Germany.....	6,064	1,535		
Hongkong.....	385,011	465,209	11,125	7,485
Japan.....	3,672,468	4,558,499	626,624	548,758
United Kingdom.....	68,991	47,095	196	1,114
Other foreign.....		366,404	242,210	164,840
Total foreign.....	6,797,048	8,322,319	1,151,218	5,840,907
United States.....	45,604,156	42,121,474	79,395,388	82,409,114
Grand total.....	51,801,204	50,743,793	80,546,606	88,250,021

The following table shows the domestic exports by articles for the fiscal years 1918-19:

Articles.	United States, 1919.		Foreign, 1919. ¹	
	Quantity.	Value.	Quantity.	Value.
	Pounds.		Pounds.	
Sugar.....	1,097,540,707	\$64,557,857	70,054,101	\$3,939,432
Coffee: Raw.....	6,417,524	1,003,342	1,221,696	180,806
Fruits and nuts ²		12,055,579		60,765
Rice.....	1,497,020	131,594	4,900	356
Hides.....	1,643,515	337,611		
Other.....		3,969,407		1,654,476
Total.....		82,055,390		5,835,835

Articles.	Total, 1919.		Total, 1918.	
	Quantity.	Value.	Quantity.	Value.
	Pounds.		Pounds.	
Sugar.....	1,167,594,808	\$68,497,289	1,080,928,593	\$64,109,967
Coffee: Raw.....	7,639,220	1,184,143	3,206,022	466,689
Fruits and nuts ²		12,116,344		8,640,838
Rice.....	1,501,920	131,950	1,247,731	84,813
Hides.....	1,643,515	337,611	1,734,319	398,719
Other.....		5,623,883		6,786,516
Total.....		87,891,225		80,487,542

¹ For fiscal years ending Mar. 31.

² Mostly pineapples.

Customs and internal revenue receipts.—Customs receipts for the year were \$858,258.25, as against \$1,009,243.48 for the previous year. The total customs receipts since the organization of the Territorial government in 1900 aggregate \$24,827,883.83. Internal revenue receipts yielded \$5,831,933.19, a decrease over the previous year from this source of \$3,854,907.75.

Territorial finances.—On July 1, 1905, local governments in Hawaii were established for the first time. The Territory was then divided into four counties, one of which, namely, that comprising

the island of Oahu, was converted on January 1, 1909, into a city and county, known as the city and county of Honolulu, with a mayor. The leper settlement on the island of Molokai formed a fifth county, controlled by the Territorial board of health. The Territory continues to collect and pay over to the city and county of Honolulu and the counties of the Territory the greater part of their revenues, and in return receives back from them the cost of assessing and collecting taxes and the interest and sinking fund on bonds issued by the Territory for the benefit of the counties.

The income of the various counties aggregated \$4,692,859.63, as against \$3,872,239.17 for the prior fiscal year. The assessment of property, real and personal, in the Territory during the year aggregated \$250,524,346, as against \$235,650,967 for the prior year.

The total revenues collected by the Territory and the counties amounted to \$7,921,671.90, and the total expenditures aggregated \$8,633,189.11. The current cash balance on hand June 30, 1918, was \$711,517.21, and the current cash balance June 30, 1919, was \$442,609.95.

Bonded indebtedness.—By the provisions of section 55 of the act of April 30, 1900 (31 Stat., 114), as amended by the act of May 27, 1910 (36 Stat., 443), the Territory is permitted to issue bonds not to exceed 7 per cent of the total assessed value of the property of the Territory, but not more than 1 per cent in any one year. The last completed assessment aggregates \$250,524,346, and the borrowing capacity is therefore \$17,536,704.22, the outstanding bonds issued at present amounting to \$9,194,000. The legislature at its 1919 session provided for a bond issue of \$2,231,000. Since June 30, 1919, bonds amounting to \$200,000 have been issued, and the Territorial treasurer is now endeavoring to float additional bonds to the amount of \$1,500,000. The issue of \$200,000 is for the purchase of the Irwin estate property at Wakiiki Beach, Honolulu, as a memorial park for Hawaii's heroes in the recent World War.

The Territorial bonded indebtedness June 30, 1919, is as follows:

Date of issue.	Term of years.	Inter-est.	Sale price.	Percent-age basis.	Aggregate outstanding.	Date due.	Where sold.
		<i>Per cent.</i>					
Oct. 4, 1905	5 to 15	4	\$101.375	3.70	\$270,000	Oct. 4, 1920	Honolulu.
Jan. 2, 1906	5 to 15	3½	98.125	3.66	750,000	Jan. 2, 1921	New York.
Oct. 1, 1907	5 to 15	3½	98.150	3.66	294,000	Oct. 1, 1922	Honolulu.
Oct. 1, 1909	5 to 15	3½	98.250	3.65	200,000	Oct. 1, 1924	Do.
Aug. 1, 1911	20 to 30	4	101.5875	3.88	1,500,000	Aug. 1, 1941	New York.
Sept. 3, 1912	20 to 30	4	100.5887	3.985	1,500,000	Sept. 3, 1942	Do.
Sept. 15, 1914	20 to 30	4	100.01	4.00	1,430,000	Sept. 15, 1944	New York and Honolulu.
May 15, 1916	20 to 30	4	100.00	4.00	1,750,000	May 15, 1946	Do.
Aug. 1, 1917	20 to 30	4	98.04	4.08	1,500,000	Aug. 1, 1947	Do.
Total..	.....	.....	.....	.....	9,194,000	.....	.....

The total bonded debt on July 1, 1918, was \$8,749,000, which was increased by the sale of \$445,000 of the Aug. 1, 1917, issue of 4 per cent public improvement bonds, 1917, out of a total authorized issue of \$1,500,000.

Bank deposits and insurance.—Twenty-six banks were in operation during the year, distributed as follows: Nine in Honolulu, two at Waialua, and one each at Schofield and Waipahu, on the island of Oahu; three at Hilo, two at North Kona, and one each at Honokaa and North Kohala, on the island of Hawaii; one each at Wailuku, Kahului, Paia, and Lahaina, on the island of Maui; and one each at Lihue and Waimea, on the island of Kauai. Three are national banks, namely, one at Honolulu, one at Schofield, and one on the island of Maui. One of the banks is solely a savings bank, two are solely commercial, and the remainder are both commercial and savings banks.

Bank deposits at the end of the year amounted to \$35,349,134.36, of which amount \$24,898,287.81 were commercial deposits and the remainder, \$10,450,846.55, were savings deposits.

Fire insurance premiums during 1918 amounted to \$932,259.59, and fire losses to \$50,702.58; marine premiums amounted to \$594,739.37, and losses to \$50,833.44. Life insurance written was valued at \$5,271,700.40, the premiums paid thereon amounted to \$268,290.20, and the losses paid aggregated \$526,694.31.

Corporations.—During the year 79 corporations were created and dissolved, as follows, to wit: Created, mercantile 56, dissolved 14; agriculture, created 6, dissolved 4; banking, created 1; savings and loans, created 2; eleemosynary, created 14; leaving at the close of the year 853 domestic corporations, an increase of 61 in all. The total capitalization of domestic corporations other than eleemosynary, etc., is \$175,676,553, an increase of \$4,292,610, or 2.50 per cent for the year. Foreign corporations to the number of 152, as compared with 144 of the preceding year, are authorized to do business in the Territory. The classes, number, and capitalization of the domestic corporations now in existence incorporated before and after the transfer of sovereignty to the United States are as follows:

Hawaiian corporations.

	Number.			Capital.		
	Incorporated before Aug. 12, 1898.	Incorporated since Aug. 12, 1898.	Total.	Incorporated before Aug. 12, 1898.	Incorporated after Aug. 12, 1898.	Total.
Agricultural.....	45	110	155	\$47,866,750	\$36,036,515	\$83,903,265
Mercantile.....	37	438	475	16,141,125	50,680,203	66,821,328
Railroad.....	5	4	9	7,370,000	7,139,960	14,509,960
Street car.....		2	2		1,950,000	1,950,000
Steamship.....	1	1	2	3,000,000	6,000	3,006,000
Bank.....	1	7	8	600,000	2,750,000	3,350,000
Savings and loan.....		15	15		836,000	836,000
Trust.....	1	6	7	200,000	900,000	1,100,000
Insurance.....		2	2		200,000	200,000
Eleemosynary.....	34	144	178			
Total.....	124	729	853	75,177,875	100,498,678	175,676,553

Public lands.—The following table shows the total area of Government lands and their estimated valuation as of June 30, 1919:

Classification.	Area.	Total area.	Total valuation
Agricultural lands.....		44,288.16	\$3,896,984.71
Cane lands.....	25,659.19		
Other agricultural lands.....	16,147.13		
Rice and taro lands.....	2,123.00		
Fish ponds, etc.....	358.84		
Net homestead area.....		35,802.78	1,228,864.75
Homesteads sold, amount unpaid.....	21,134.85		
Homesteads opened, untaken.....	12,178.75		
Homesteads surveyed, not opened.....	2,489.18		
Homesteads, exchanges and reserves.....		1,887.62	108,378.00
Pastoral lands (not cultivable).....		458,179.94	1,326,484.94
Total salable lands.....		540,158.50	6,560,712.44
Total forest lands.....		592,958.00	2,786,084.69
Forest lands.....	215,085.35		
Forest reserves.....	377,872.65		
Total area of lands of value.....		1,133,116.50	
Lands, no value.....		507,126.69	
Total public lands.....		1,640,243.19	9,346,797.13

Homesteads.—There were taken up during the year 552 homestead lots covering an area of 8,877.364 acres, at valuations aggregating \$563,942.85, or \$63.53 per acre on the average. The homesteads taken averaged 16.082 acres each. They were taken by different nationalities as follows: Hawaiians, 165; Portuguese, 67; Americans, 47; others, 75. To enable homesteaders to obtain homesteads of suitable sizes for their needs they are given the option of taking one or two, or in some cases more lots. There were taken under special homestead agreements 473 lots, under certificates of occupation, 16; under right-of-purchase leases, 39; under cash freehold agreements, 2; homestead leases, 22; and special sales agreements, 37.

During the year 78 homesteads were surrendered or forfeited, covering an area of 1,766.823 acres, valued at \$25,825.21. During the same period 92 transfers of homestead lots were made, having an area of 1,892.69 acres.

A total of 206 planting agreements, representing 3,911.07 acres, were signed. During the year there were sold at auction for cash 28 lots, including residence, church, and business site lots, containing a total area of 69.364 acres, for \$10,691.75. A total of 70 general leases covering 88,319.498 acres were sold at an aggregate annual rental of \$22,992.82.

Patents, leases, and licenses.—There were issued during the year 229 patents, covering an area of 2,946.76 acres, for considerations aggregating \$106,161.87 or at the rate of \$36.02 per acre. Of these 35 were right-of-purchase leases, 10 land exchange, 35 time payments, 7 cash freehold agreements, 47 cash purchases, 44 preference rights, 1 compromise with abutting owner. There were also issued 3 patents based on land-commission awards upon payment of commutation, the

area being 3,328 acres and the commutation \$34. Land and water licenses, seven in number, were issued, bringing a total annual rental of \$2,492.20.

Revenues and disbursements.—The total receipts of the land department were \$545,751.13 as compared with \$575,015.21 for the preceding year. The expenditures of the land department were \$33,905.74 as against \$32,640.01 during the previous year.

Population, immigration, and labor.—The estimated population, including that of the Army and Navy, on June 30, 1919, was 263,666, an increase of 70,757, or 36.68 per cent since the census of 1910. The estimated population of Honolulu, the capital of the Territory, is 78,200. The estimated population of the islands as of June 30, 1919, is as follows: Hawaiian, 22,600; part Hawaiian, 16,660; Portuguese, 25,000; Spanish, 2,400; Porto Rican, 5,400; other Caucasian, 31,000; Chinese, 22,800; Japanese, 110,000; Filipino, 22,000; all others, 5,806.

The number of births during the year was 9,164, as against 9,404 for the previous year. The birth rate per 1,000 population was 34.76, as compared with 36.71 for the previous year. The total number of deaths from all causes was 4,051, as against 4,572 the previous year. The total number of steerage arrivals was 7,435, as against 7,321 for the previous year; the number of departures from the islands was 7,401, as against 8,885 for the prior year, divided as follows: Chinese, 495; Japanese, 5,199; Filipinos, 994; Hindus, 1; Koreans, 33; Porto Ricans, 43; Portuguese, 226; Spanish, 283; Russians, 127; all others, 538.

Public health.—An analysis of the morbidity and mortality statistics shows an increase of 41 in the number of deaths and of 12,577 in the number of contagious diseases as compared with the previous year. The large increase in contagious diseases is due to the epidemic of influenza, which was made a reportable disease by resolution of the board of health on October 21, 1918. In view of the fact that the deaths from influenza number 612 and the total of deaths increased but 41 over the fiscal year ending June 30, 1918, the health of the Territory may be considered to have been good, and the percentage of deaths, especially from influenza, much less than in most communities on the mainland.

The total number of deaths was 4,051, and the annual death rate for 1,000 of population was 15.36. There were 14,616 cases of contagious diseases reported. Tuberculosis, leprosy, and measles increased in numbers while other diseases decreased. No case of bubonic plague was reported during the year; the number of cases of typhoid fever decreased 50 per cent.

Insane asylum.—At the end of the fiscal year, June 30, 1918, there were under treatment in the institution, paroled, and escaped, 251 males and 94 females, a total of 345. There were admitted during

this year 84 males and 33 females, a total of 117. A total of 462 patients, 335 males and 127 females, were treated during the year. A total of 34 patients, 22 males and 12 females, were discharged as recovered, and 5 males and 3 females were discharged as improved during the year. For the same period of time 38 deaths occurred, 30 males and 8 females; there remaining in the institution and on parole as of June 30, 1919, 278 males and 104 females, or a total of 382.

Leprosy.—The number of lepers living at the settlement at Kalau-pau and Kalawao during the year was 669, and of these 425 were males and 244 were females; one was released on parole and 57 died, leaving at the settlement on the 30th day of June, 1919, a total of 611. The nationality of the patients at the settlement was as follows: American, 1; Belgian, 1; Chinese, 24; Filipino, 18; German, 4; Hawaiian, 363; Japanese, 14; Korean, 13; Part-Hawaiian, 123; Portuguese, 44; Porto Rican, 4; Spanish, 1; New Hebrides, 1. At the Kalihi Hospital there were on the 30th day of June, 1918, 38 patients, and 125 were admitted during the year; 60 were transferred to Molokai; 10 were declared not lepers; 19 were paroled and allowed to return to their homes with orders to report regularly to the Government physician in their district; and 6 died, leaving 65 patients in the hospital on the 30th of June, 1919. President Dean, of the College of Hawaii, has given valuable assistance in the preparation of chaulmoogra oil. The results of the last year's work are reported to be especially gratifying. Twenty patients in all were paroled and each one has been examined regularly without recommittal.

Transportation facilities.—Serious congestion in passenger travel and frequent long waits in freight and mail accommodations have continued during the year, owing to a number of large vessels having been in war service in the Atlantic Ocean. Long lists of persons desiring to go to the mainland have crowded the books of the steamship companies for months ahead of sailing dates and hundreds of persons have been unable to secure transportation.

The situation will undoubtedly grow better shortly, and the increase of commerce on the Pacific Ocean will send a larger number of vessels to Hawaiian ports.

Traffic with the mainland.—The Matson Navigation Co. operates the *Manoa*, *Sachem*, and *Lurline* of 6,805 tons, 3,130 tons, and 5,928 tons, respectively, between San Francisco and Honolulu, and the *Enterprise*, 2,675 tons, between San Francisco and Hilo.

Three big steamers of this company, the *Maui*, *Matsonia*, and *Wilhelmina* of 10,261 tons, 9,728 tons, and 6,974 tons, respectively, were operated by the United States Government in the war zone and are still retained for Government purposes. The *Lurline* and

Manoa made three voyages to Manila during the year, calling at Honolulu both ways.

In the freight trade the *Hyades*, 3,753 tons, and the *Annie Johnson*, power schooner, 1,049 tons, were recently returned to island traffic after having been requisitioned by the Federal Shipping Board between October, 1918, and April, 1919. Sundry freight vessels of American and Danish registry are consigned to this company, and all have taken cargoes of sugar or canned pineapples on their return voyages to San Francisco or Atlantic ports. The company has recently instituted a Seattle-Honolulu-San Francisco-triangular freight service with four steamers which were built for the United States Shipping Board. It is anticipated that when this line is fully established there will be a sailing every 10 days from Seattle.

The American Hawaiian Steamship Co., which has been in the island trade since January, 1901, has operated during the year 1919 a number of Shipping Board vessels allotted to it in place of its regular vessels, all of which had been requisitioned by the Government for war work and placed in service on the Atlantic Ocean. This substitute fleet has transported approximately 185,000 tons of sugar during 1919 from Hawaiian Island ports to Atlantic ports via the Panama Canal. As the Government will probably soon release the regular fleet, it is anticipated that the regular service between New York and the Hawaiian Islands via the canal will be resumed during the early part of 1920.

Through traffic.—The China Mail Steamship Co. operated the steamers *China* and *Nanking* between San Francisco and oriental ports, carrying first, second, and third class passengers to and from Honolulu. Early in May, 1919, the *Nanking* was requisitioned by the Federal Government for war purposes, and it is not the intention of the owners to have this vessel call at Honolulu when returned to private operation.

The Pacific Mail Steamship Co. has continued to operate the *Ecuador*, *Venezuela*, and *Colombia*, vessels of 14,000 tons each, between San Francisco and oriental ports with stop-overs at Honolulu both ways. In addition, the company has a Manila-East India service with two 16,000-ton passenger and freight steamers, the *Santa Cruz* and *Colusa*, which also stop regularly at Honolulu on the homeward voyage.

The Toyo Kisen Kaisha is again operating its full fleet of steamers, consisting of the *Shinyo Maru* and *Tenyo Maru*, of 22,000 tons each, the *Siberia Maru* and *Korea Maru*, of 20,000 tons each, the *Nippon Maru*, of 14,000 tons, and the *Persia Maru*, of 9,000 tons. These vessels are on the run between China, Japan, and Honolulu, and San Francisco, while the *Anyo Maru*, of 18,500 tons, the *Kiyo Maru*, of

17,200 tons, and the *Seiyo Maru*, of 14,000 tons, are on a run including China, Japan, Honolulu, San Francisco, Mexico, Panama, and South America. These three vessels call at Hilo after leaving Honolulu on the outward trip from Japan. The *Persia Maru* and *Seiyo Maru* were recently returned to the company by the United States Government after seeing considerable service in the Atlantic war zone. With the return of the *Seiyo Maru* to the South American service the *Nippon Maru* was again placed on her regular run between San Francisco and the Orient.

The Oceanic Steamship Co. is operating the two passenger steamers *Sonoma* and *Ventura*, 6,200 tons each, and the freight steamer *Jacox*, 3,500 tons, on the run between San Francisco and Sydney, by way of Honolulu and Pago Pago. The *Sonoma* and *Ventura* touch at each point every four or five weeks. The *Jacox* makes the round trip every three months.

The Canadian-Australasian Royal Mail Line has the *Niagara* and *Makura*, 13,500 and 8,075 tons, on the Sydney-Vancouver run. Steamers sail from Honolulu north about every 28 days. It is stated that the *Makura* will eventually be removed and another steamer, probably a trifle larger than the *Niagara*, put in her place. The trip from Sydney to Vancouver and return requires 36 days, including a stop of five days at Vancouver.

The Standard Oil Co. operates a fleet of five steamers between the mainland and the Territory. These vessels delivered during the calendar year 1918 a total of 495,080 barrels of fuel and refined oils and 26,433 cases and 989 barrels of lubricating and refined oils.

The Associated Oil Co. operates four vessels and during the fiscal year these delivered 477,802.27 barrels of fuel oil.

The Union Oil Co. of California, which operates four steamers, received during the fiscal year 53,332.94 barrels of fuel oil.

A number of sailing vessels continue to bring general merchandise and coal from foreign ports.

Interisland traffic.—Most of the interisland traffic is conducted by the Inter Island Steam Navigation Co. (Ltd.), which operates a fleet of 12 steamers, varying in length from 136.1 feet to 252 feet and from 11.5 to 18 feet draft; from 341 to 1,566 gross tons and from 201 to 940 net tons. The total tonnage is 8,987 gross and 5,834 net.

During the fiscal year this company carried 81,803 passengers and 400,030 tons of freight, which is a decrease of 8,395 passengers and a decrease of 2,115 tons of freight as compared with the previous period.

The Oahu Shipping Co. operates a fleet of six motor vessels with a gross tonnage of 569 tons, two seagoing barges, and an oil vessel. During 1918 this company carried 66,670 tons of freight between island ports. No passengers are carried.

Steam railroads.

Islands.	Number.	Track.	Increase.	Gauge.	Rolling stock.		
					Locomotives.	Passenger cars.	Freight cars.
Oahu ¹	2	<i>Miles.</i> 125.84	0.76	<i>Fl. in.</i> 3 0	26	51	707
Hawaii.....	3	115.00	-----	$\left\{ \begin{array}{l} 3 \ 0 \\ 4 \ 8 \\ 3 \ 0 \end{array} \right\}$	16	18	264
Maui.....	1	42.11	.83	3 0	9	6	173
Kauai.....	1	19.22	-----	2 6	1	-----	29
Total.....	7	302.17	1.59	-----	52	75	1,173

Islands.	Freight carried.	Passengers carried.	Bonds outstanding.	Rate of interest.	Capital stock.
	<i>Tons.</i>			<i>Per cent.</i>	
Oahu.....	925,502	1,592,440	\$2,000,000	5	\$5,150,000
Hawaii.....	205,836	430,688	2,350,000	5	4,114,960
Maui.....	315,657	115,896	-----	-----	300,000
Kauai.....	13,854	-----	348,000	6	500,000
Total.....	1,458,849	2,139,024	4,698,000	-----	10,064,960

¹ Figures from Oahu on freight and passengers carried are for the Oahu Railway & Land Co. During the calendar year 1918 the Koolau Railway Co. carried 4,775 passengers and 22,347 tons of freight.

PRIVATE (PLANTATION) RAILWAYS.

Island.	Number.	Track.	Increase.	Locomotives.	Passenger cars.	Freight cars.
Oahu.....	9	201.00	3.25	33	18	2,792
Hawaii.....	11	111.54	.50	29	2	1,509
Maui.....	5	146.26	2.00	20	1	2,663
Kauai.....	10	208.76	-----	38	9	3,091
Total.....	35	667.56	5.75	120	30	10,055
Grand total.....	42	969.73	7.34	172	105	11,228

Street railroads.—The Honolulu Rapid Transit & Land Co. controls and operates the only street railway system in this Territory. It is an electric line, partly single and partly double track.

During the year the company expended for betterment of the system \$95,411.47. Outstanding capital stock is \$2,000,000. Gross income for the calendar year of 1918 was \$735,151.14, an increase of \$8,547.74 over that of the preceding year. Disbursements were \$814,736.71, an increase of \$14,744.93. The number of fare passengers was 14,304,489, a decrease of 73,603 from the previous year. The number of free passengers carried, principally policemen, letter carriers, firemen, and employees, was 177,219, a decrease of 14,083. School children are carried at half rate. The car mileage was 2,069,359.61.

Telegraphs and telephones.—In addition to the cable system across the Pacific Ocean which has been in operation a number of years,

there are three wireless plants, which are either wholly or in part operated by the Government. The Government has also operated the interisland wireless system of the Mutual Telephone Co. of Honolulu since the beginning of the war.

The sending station of the Marconi Wireless Co., which was taken over by the Government upon the day war was declared, was turned back on March 20, 1918, but is being held in readiness to be placed in operation upon short notice. The Marconi sending station at Koko Head was taken over by the Government on January 8, 1918. On August 1, 1919, the Government ceased to operate this station, but is still holding it. It is expected that with the ratification of the peace treaty the company will be put in full charge of both stations, which will then be operated on a duplex system.

The Mutual Telephone Co. operates the principal telephone system on the island of Oahu, and now has in operation 775 instruments, with 43 miles of conduit, 115 miles of cable, and 1,300 miles of open wire in Honolulu alone. Outside of the city it has 1,164 miles of copper wire, 1,675 miles of iron wire, and 777 instruments.

On the island of Hawaii the Hawaii Telephone Co. of Hilo operates 1,521 instruments, with 2,600 miles of open wire. The Kohala Telephone Co. on the same island operates 103 telephones, on 225 miles of wire, and will add 150 miles of wire and several telephones next September.

The Mutual Telephone Co. of Wailuku, Maui, operates 1,059 instruments with 1,812 miles of wire, and the Kauai Telephonic Co. of Lihue, Kauai, has 280 telephones and 495 miles of wire in operation.

Education.—During the year there were maintained 168 public schools, with 1,063 teachers and 36,102 pupils, an increase of 5.1 per cent over the previous year. The cost of general maintenance of schools during 1919 was \$1,206,924.32, and the cost of new buildings was \$167,910.49. The number of private schools was 61, having 370 teachers and a total attendance, male and female, of 7,169. The number of pupils of all races in public and private schools was 43,271, as against 41,644 for the year 1918.

At the beginning of the year nearly all of the men students at the College of Hawaii were enrolled in the Student Army Training Corps. After demobilization in December there were many readjustments; the military experience obtained by the students had much of an educational value. A course in sugar technology has been placed on a better basis by an arrangement under which students are enabled to work at the experiment station of the Hawaiian Sugar Planters' Association and at the factory at Kahuka. The total regis-

tration for the year was 145, of whom 68 were studying for degrees; by classes there were, graduates, 1; seniors, 5; juniors, 6; sophomores, 16; freshmen, 14. The geographical distribution of the students is as follows: Oahu, 118; Hawaii, 12; Kauai, 4; Maui, 6; Japan, 2; China, 1; California, 1; and Michigan, 1.

There are two industrial schools in the Territory, one for boys, situated at Waialeale on the northern shore of the island of Oahu, and one for girls at Moiliili, a suburb of Honolulu. These institutions receive and care for all the juvenile delinquents who are not paroled and put on probation by the juvenile court in Honolulu or the circuit judges of the outside islands, who also act as juvenile judges. The instruction is chiefly of a vocational nature, and the children receive a portion of their earnings. There were 143 boys in the boys' school at the end of the fiscal year, having ages ranging from 8 to 20 years, and in the girls' school there were 114 girls. As a war measure the girls worked in a local pineapple cannery during the summer and with a part of the money thus earned bought a thousand-dollar Liberty bond.

In the Hawaiian Library the registration at the end of the year was 8,957, an increase of 760 over the previous year. The home use of books aggregated 115,518, greater by 7,641 than any previous period. Of those holding library cards, 54.2 were adults and 45.8 children. The number of visitors to the reading and reference rooms totaled 51,800, and the number of books in the library 41,860. Library instruction has been given to all grammar-school grades above the fourth, and the children taught the use of catalogues and ordinary reference books. There has been a notable gain in attendance of the children at the library. The islands department has increased its stations from 163 to 224, of which 57 are community libraries, 79 school libraries, and 88 home libraries. The library holds an important place as a social center, there being 291 meetings of various kinds held there during the year.

The indexing of the correspondence of the archives of Hawaii, which was discontinued in May of 1918, has been resumed and will be continued during the coming year. The indexing of important matters in the bound volumes of newspapers on file has been finished up to 1904. This index, which begins with 1836, has proven of great value, and information on a variety of subjects official and historical has been supplied.

There was compiled, by the librarian, a "Roster of the Legislature of Hawaii" from 1841 to and including the session of 1919. This book of 300 pages contains not only a list of members of the different sessions, but also the several constitutions of the Kingdom of Hawaii, and that of the Republic, the speeches of the monarchs from Kame-

hameha III to Liliuokalani, and of the President to the legislature, and an alphabetical list of members during the period mentioned, giving individual records. A historical sketch of the evolution of the legislature since the creation of a law-making body, by proclamation of the King in 1829, forms the preface. The work was published in February, 1919, as publication No. 1, of the archives of Hawaii, and given wide distribution both in Hawaii and on the mainland. It has met with a very favorable reception and has been highly commented on by a number of State and law librarians.

Work on the revision of the Hawaiian Dictionary was continued. Act 18, session laws of 1913, put this work under the direction of the archives commission. Act 123, session laws of 1919, provides that all future work shall be done by a commission of three persons, to be appointed by the governor upon the recommendation of the commissioners of public archives, said commissioners to continue the supervision of the work.

Legislature.—The principal business enacted by the legislature at the session of 1919 was financial. Of the 242 acts approved, 94 involved money from the general fund. In addition the legislature enacted a loan bill providing for public improvements to the amount of \$4,901,698, more than half of which is for wharf and harbor improvements. Concurrent resolutions were also adopted recommending that the governor set aside lands for nine public parks. Certain members of the 1919 legislature, by going back on their pledge to support woman suffrage, earned the ill will of a large majority of the people, and as a result the legislature received little credit for any good legislation. Following is a list of some of the measures enacted:

Act 15. To provide for a quarantine station in the city of Hilo.

Act 22. Permitting the practice of chiropractic.

Act 50. Providing for the issuance of \$200,000 of bonds to build a breakwater at Nawiliwili, Kauai, the Federal Government to appropriate at least an equivalent amount.

Act 62. Amending the municipal act.

Act 63. Modifying the power of eminent domain as exercised by counties.

Act 73. Providing for training of nurses at the Queen's Hospital and issuing certificates to them.

Act 83. Giving further protection to forest reserves.

Act 97. Providing for an appropriation for the celebration of the centennial of the death of Kamehameha I.

Act 102. Making an appropriation to provide for the feeble-minded.

Act 107. Providing an increase in the pay of school-teachers.

Act 109. Relating to the storage of explosives.

Act 118. Making an appropriation to build a wharf at Kapaa, Kauai.

Act 121. Providing for a fish and game commission, to establish a fish hatchery and appropriating \$25,000 for the use of the commission.

Act 129. To provide for the support of children of indigent, widowed, or abandoned mothers, and creating local boards to administer such support.

Act 131. For the establishment of a school for blind and other defective children.

Act 138. Providing for the acquisition of property at Nawillwill, Kauai, for wharf and warehouse purposes.

Act 158. Amending the sinking fund act.

Act 186. Defining the crime of criminal syndicalism and providing punishment therefor.

Act 187. Making an appropriation to provide for calling a Pan-Pacific Congress in Honolulu, 1920-21.

Act 190. Providing for the purchase of the Irwin Beach property at Waikiki, to be made a part of Kapiolani Park.

Act. 203. Changing the College of Hawaii to a university.

Act 207. Consolidating all the laws providing for the issuance of public loans.

Act 212. Establishing a biological laboratory at the Kapiolani Park Aquarium and placing the College of Hawaii in charge.

Act 225. Farm loan act, with an appropriation of \$100,000 for advances to homesteaders.

Act 227. Providing for the identification of automobiles belonging to the Territorial or county governments, so as to be used for official business only.

Act 229. Providing for the purchase of Washington Place, the former residence of Queen Liliuokalani, as an executive mansion.

Act 233. Regulating investment companies so as to provide against fraud in the sale of securities.

The legislature adopted a concurrent resolution providing for the appointment by the governor of a commission to have charge of the celebration in 1920, of the landing here of the first missionaries, March 31, 1820.

Following is a list of some of the more important resolutions passed:

House concurrent resolution 2. Requesting Congress to amend the Federal farm-loan act so as to include the Territory of Hawaii in its provisions.

House concurrent resolution 3. Requesting Congress to amend the organic act so as to allow the homesteading of larger areas of pastoral lands.

House concurrent resolution 4. Requesting Congress to appropriate funds for roads and water systems in homestead tracts and to assist homesteaders and farmers in the Territory of Hawaii.

House concurrent resolution 16. Requesting Congress to enact a law so as to allow half the customs and internal-revenue receipts collected in the Territory of Hawaii for 20 years from date of July 1, 1918, to be placed in a separate fund and expended only for public works in the Territory of Hawaii.

House concurrent resolution 28. Requesting Congress to amend the organic act in regard to homesteading.

House concurrent resolution 30. Asking that suspension of the coastwise shipping law, as applied to passenger traffic, remain in force until more American steamers are plying between Hawaii and the mainland of the United States.

Senate concurrent resolution 5. Requesting the right of statehood for the Territory of Hawaii.

Senate concurrent resolution 7. Requesting Congress to extend the benefits of the reclamation act to Hawaii.

Senate concurrent resolution 8. Favoring the enactment of a law whereby persons appointed to Federal positions in the Territory of Hawaii shall have resided for not less than one year in such Territory.

Senate concurrent resolution 11. Requesting an amendment to an act of Congress approved March 28, 1916, so as to authorize the Territorial board of harbor commissioners to make toll or tonnage charges on freight passing over wharves, etc.

Senate concurrent resolution 17. Requesting that the abandoned Federal Leprosarium at Kalawao, Molokai, be turned over to the Territorial board of health for the care and treatment of lepers.

Senate concurrent resolution 20. Directing the attorney general of the Territory of Hawaii to compile a list of, and a report upon, the cost incident to the acquisition by condemnation of all private fishing rights within the Territory of Hawaii.

Senate concurrent resolution 31. Providing for the appointment by the governor of a commission to investigate and report on the feasibility of establishing a free port or zone in the Territory of Hawaii.

Senate concurrent resolution 36. Authorizing and requesting the governor to appoint a commission to be known as the "Legislative Commission of the Territory," for the purpose of assisting the Delegate to Congress by their presence in Washington in the presentation of measures to Congress.

GENERAL EDUCATION BOARD.

This corporation, which was created by the act of Congress approved January 12, 1903, section 6 of which requires the corporation to annually file with the Secretary of the Interior a report, in writing, stating in detail the property, real and personal, held by the corporation, and the expenditure or other use or disposition of the same or the income thereof during the preceding year, has for its object the promotion of education within the United States. The corporation owns no real estate, its property consisting of securities and money divided into various funds, according to the purpose for which it is to be used.

On June 30, 1919, the principal funds belonging without restriction to the board amounted to \$34,176,110.01, invested in stocks and bonds.

The income from the above funds, together with the income from undisbursed income, amounted during the year to \$2,982,210.08. The balance of income from previous year as of June 30, 1918, amounting to \$8,074,037.92, together with a gift from Mr. John D. Rockefeller from his special fund, amounting to \$349,746.91, increased the total amount available for disbursement to \$11,405,994.91.

Disbursements from income during the year were as follows:

Universities and colleges for whites, for endowment.....	\$564, 910. 96
Colleges and schools for whites, for current expenses.....	12, 500. 00
Professors of secondary education.....	35, 634. 70
Rural school agents, white.....	60, 257. 55
Lincoln School.....	115, 000. 00
Colleges and schools for negroes.....	170, 535. 00

Meharry Medical School (Negro).....	\$7,500. 00
Rural school agents for negroes.....	47,988. 77
Summer schools for negroes.....	9,570. 00
County training schools for negroes.....	18,711. 28
Home-makers' clubs for negroes.....	35,481. 08
Expenses of special students at summer schools.....	12,727. 14
Negro rural school fund.....	20,000. 00
John F. Slater fund.....	3,000. 00
Association of colleges for negro youths.....	500. 00
Maine agricultural demonstration work.....	24,284. 47
New Hampshire demonstration work.....	16,000. 00
Educational investigation and research.....	18,053. 69
General survey of educational conditions and needs in North Carolina..	2,081. 31
General survey of educational conditions and needs in Virginia.....	8,046. 35
Survey of mental measurements of school children.....	3,575. 87
Expenses rural school agents at Harvard summer school.....	7,662. 37
Model county organization.....	9,950. 00
Conferences.....	4,485. 66
University of Chicago (interest).....	27,157. 51
Yale University (interest).....	21,858. 75
Lafayette College (interest).....	515. 44
Administration expense.....	136,359. 32
	1,394,347. 22

This leaves an undisbursed balance of income on June 30, 1919, of \$10,011,647.69. It is invested as follows: Bonds and stocks, \$9,204,-190.60; cash, \$774,479.85; accounts receivable, \$32,977.24.

It should be noted, however, that against this balance there are unpaid appropriations amounting to \$9,381,338.72.

The John D. Rockefeller special fund, mentioned in previous reports, is now completely used. The special fund derived its income from that portion of the funds set aside for the University of Chicago which remains undelivered, together with income from undisbursed income. On August 22, 1919, Mr. John D. Rockefeller surrendered his control over this fund, giving to the board the balance carried forward June 30, 1918, of \$264,955.31 and income received and to be received, which amounted during the year to \$84,791.60.

The Anna T. Jeanes fund, the income to be used for Negro rural schools, amounts to \$200,000. It is invested as follows: Bonds, \$164,355; stocks, \$35,645.

The income from this fund during the year was \$10,141.95. Added to the balance from the previous year, the total available income amounted to \$16,780.26. Of this, \$10,353.01 was appropriated and paid to various schools, and \$28.83 paid out for expenses, leaving a balance of \$6,398.42 in cash.

APPENDIX A.

LAND CLASSIFICATION.

Land classification, with progress of coal classification and valuation.

STATUS ON JULY 1, 1918.

State.	Withdrawals outstanding.	Coal lands classified and appraised.	Valuation.	Valuation at minimum price.
	<i>Acres.</i>	<i>Acres.</i>		
Arkansas.....	141,945	60,715	\$1,473,762	\$1,214,280
Arizona.....	17,643	7,720	585,086	154,404
California.....	4,498,376	2,881,374	105,522,340	51,483,754
Colorado.....	4,761	4,603	89,624	79,060
Idaho.....	10,612,112	5,782,216	137,365,396	121,469,318
Montana.....	83,833	5,880	117,600	117,600
Nevada.....	5,586,244	665,565	16,349,351	8,029,868
New Mexico.....	14,232,501	11,409,789	199,382,666	203,518,259
North Dakota.....	4,361	7,195	128,051	95,299
Oregon.....	244,874	244,874	2,711,462	2,711,462
South Dakota.....	5,314,075	1,069,631	45,088,853	14,560,647
Utah.....	824,074	1,866	38,520	37,320
Washington.....	2,437,563	7,238,515	387,802,633	108,386,785
Wyoming.....				
Total.....	43,757,488	29,379,943	986,655,344	511,858,056

STATUS ON JULY 1, 1919.

Arkansas.....		60,715	\$1,473,762	\$1,214,280
Arizona.....	141,945			
California.....	17,643	7,720	585,086	154,404
Colorado.....	4,500,511	2,881,494	195,531,620	51,486,154
Idaho.....	4,761	4,603	89,624	79,060
Montana.....	10,612,032	5,783,336	137,410,916	121,654,418
Nevada.....	83,833	6,803	128,830	117,600
New Mexico.....	5,585,244	666,205	16,392,111	8,035,468
North Dakota.....	10,902,615	11,409,709	199,382,266	203,519,859
Oregon.....	4,361	7,195	174,843	117,729
South Dakota.....		244,874	2,711,462	2,711,462
Utah.....	5,313,836	1,069,871	45,101,333	14,565,447
Washington.....	824,074	1,866	38,520	37,320
Wyoming.....	2,437,723	7,238,635	387,820,153	108,389,185
Total.....	40,428,542	29,383,086	986,828,526	512,082,386

Withdrawals and restorations.

OIL LAND.

State.	Withdrawals outstanding July 1, 1918.	Fiscal year ended June 30, 1919.		Withdrawals outstanding July 1, 1919.
		Withdrawals.	Restorations.	
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Arizona.....	230,400			230,400
California.....	1,257,229			1,257,229
Colorado.....	87,474	135,503		222,977
Louisiana.....	467,030			467,030
Montana.....	¹ 1,351,891			¹ 1,351,891
North Dakota.....	84,891			84,894
Utah.....	1,962,787			1,962,787
Wyoming.....	1,083,900	98,657	931	1,181,626
Total.....	6,525,605	234,160	931	6,758,834

PHOSPHATE LAND.

Florida.....	119,737			119,737
Idaho.....	1,015,717			1,015,717
Montana.....	287,883			287,883
Utah.....	302,465			302,465
Wyoming.....	998,592			998,592
Total.....	2,724,394			2,724,394

POTASH LAND.

California.....	91,207		600	90,607
Nevada.....	39,422			39,422
Total.....	130,629		600	130,029

MINERAL LAND.

Arizona.....	8,507			8,507
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OIL SHALE LAND.

Colorado.....	45,440		3,880	41,560
Nevada.....		650	527	123
Utah.....	86,584			86,584
Total.....	132,024	650	4,407	128,267

¹ This item is 5.786 acres greater than was given in report for the preceding fiscal year. The discrepancy is the result of an error in computing the acreage of a withdrawal in Montana made and reported during the last fiscal year. The withdrawn area in Montana outstanding June 30, 1918, should have been reported as here given.

Metalliferous classification.

(Northern Pacific Railroad grant lands, Idaho and Montana.)

	Classified prior to July 1, 1918.	Classified June 30, 1919.
	<i>Acres.</i>	<i>Acres.</i>
Mineral.....	224,218	224,218
Nonmineral.....	334,794	334,794
Total.....	559,012	559,012

Miscellaneous classifications.

[Lands chiefly in present and former Indian reservations.]

	Classified prior to July 1, 1918.	Classified June 30, 1919.
MINERAL AND NONMINERAL LAND.		
Mineral.....	<i>Acres.</i> 189,172	<i>Acres.</i> 189,172
Nonmineral.....	7,394,331	7,394,331
Total.....	7,583,503	7,583,503
OIL LAND.		
Montana.....	42,097	42,097
PHOSPHATE LAND.		
Idaho.....	4,080	4,080
Wyoming.....	20,576	20,576
Total.....	24,656	24,656

Oil shale classification.

State.	Classified prior to July 1, 1918.		Classified during fiscal year 1918-19.		Classified June 30, 1919.	
	Mineral.	Nonmineral.	Mineral.	Nonmineral.	Mineral.	Nonmineral.
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Colorado.....	896,018		56,221	4,080	952,239	4,080
Utah.....	2,635,915	4,744	69,120		2,705,035	4,744
Wyoming.....	460,103				460,103	
Total.....	3,992,036	4,744	125,341	4,080	4,117,377	8,824

Power sites withdrawn, restored to entry, and outstanding, fiscal year 1918-19, in acres.

State.	With- drawals outstanding July 1, 1918.	Fiscal year ended June 30, 1919.		With- drawals outstanding July 1, 1919.
		With- drawals.	Restora- tions.	
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Alabama.....	120			120
Alaska.....	81,015			81,015
Arkansas.....	22,354			22,354
Arizona.....	300,368	701	5,221	295,848
California.....	277,223	11,749	78	288,894
Colorado.....	276,514	622		277,136
Idaho.....	265,467		6,994	258,473
Michigan.....	1,240			1,240
Minnesota.....	12,309			12,309
Montana.....	164,412	27	8	164,431
Nevada.....	27,361	182		27,543
Nebraska.....	761			761
New Mexico.....	62,602			62,602
Oregon.....	421,972	1,760	988	422,744
Utah.....	447,628	2,351	1,281	448,698
Washington.....	113,533		285	113,248
Wyoming.....	89,493		1,182	88,311
Total.....	2,564,372	17,392	16,037	2,565,727

Public-water reserves.

State.	With- drawals outstand- ing July 1, 1918.	Fiscal year ended June 30, 1919.		With- drawals outstand- ing July 1, 1919.
		With- drawals.	Restora- tions.	
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Arizona.....	13,066	1,080	320	13,826
California.....	52,474	3,560	.....	56,034
Colorado.....	480	1,460	40	1,900
Idaho.....	7,210	.....	170	7,040
Montana.....	5,264	2,065	45	7,284
Nevada.....	4,753	80	.....	4,833
New Mexico.....	2,926	475	40	3,361
Oregon.....	2,482	9,262	.....	11,744
Utah.....	34,627	240	.....	34,867
South Dakota.....	.....	240	.....	240
Washington.....	40	760	.....	800
Wyoming.....	81,312	3,200	760	83,752
Total.....	204,634	22,422	1,375	225,681

Reservoir-site reserves.

State.	With- drawals outstand- ing July 1, 1918.	Fiscal year ended June 30, 1919.		With- drawals outstand- ing July 1, 1919.
		With- drawals.	Restora- tions.	
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Arizona.....	23,040	.....	.....	23,040
Colorado.....	1,728	.....	.....	1,728
Montana.....	9,080	.....	.....	9,080
North Dakota.....	1,569	.....	.....	1,569
Oregon.....	10,619	.....	.....	10,619
Washington.....	35,943	.....	.....	35,943
Total.....	81,979	.....	.....	81,979

Summary of enlarged homestead designations.

State.	Outstanding on July 1, 1918.	Designations during fiscal year 1918-19.	Cancellations during fiscal year 1918-19.	Outstanding on June 30, 1919.
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Arizona.....	25,467,643	21,840	.....	25,489,483
California.....	7,557,873	857,368	.....	8,415,241
Colorado.....	27,864,474	914,525	640	28,778,359
Idaho:				
Secs. 1, 5, and 7.....	10,062,974	259,925	3,400	10,319,499
Sec. 6.....	512,837	3,400	.....	516,237
Total.....	10,575,811	263,325	3,400	10,835,736
Kansas.....	509,834	38,920	.....	548,754
Montana.....	50,378,065	287,961	120	50,665,906
Nevada.....	46,304,756	.....	.....	46,304,756
New Mexico.....	29,988,434	1,531,555	.....	31,519,989
North Dakota.....	11,631,385	279,986	654	11,910,717
Oregon.....	18,150,919	788,508	440	18,938,987
South Dakota.....	15,648,876	252,884	.....	15,901,760
Utah:				
Secs. 1, 5, and 7.....	7,501,820	182,375	.....	7,684,195
Sec. 6.....	1,424,274	.....	.....	1,424,274
Total.....	8,926,094	182,375	.....	9,108,469
Washington.....	5,563,938	2,720	.....	5,566,658
Wyoming.....	21,781,756	3,030,670	.....	24,812,426
Total.....	289,349,858	8,452,637	5,254	288,797,241

REPORT OF THE SECRETARY OF AGRICULTURE.

WASHINGTON, D. C., *November 15, 1919.*

SIR: America during the war helped to save Europe and to preserve civilization by making available to the Allies, through increased production and conservation, large supplies of foodstuffs. But for this contribution, it is difficult to see how the Allies could have waged the war to a victorious conclusion. Lacking such support and with their own producing capacity seriously crippled, the German people experienced partial famine conditions; their health and vitality were greatly impaired; and the collapse of their military power was due in no small measure to the shortage of food.

The cessation of hostilities brought no immediate improvement in Europe. On the contrary, in some respects more adverse conditions developed. Revolution became the order of the day; the directing hand of government was removed; discipline was relaxed; the morale, particularly of the people of the Central Powers, was broken; idleness and unemployment prevailed; and in some sections anarchy reigned. It was obvious that Europe could not produce sufficient foods for herself. Her crops had been short for several years and it was scarcely probable that those for 1919 would be greater than the crops of the last year of the war. Quite as unsatisfactory was the live-stock situation. In nine of the western nations the number of cattle had declined more than 7,000,000, sheep 7,500,000, swine 24,500,000, and dairy cows several millions, with a greater proportionate reduction in the volume of products.

Food relief after the armistice was imperative not only for the peoples of the new small friendly nations but also of the enemy countries. It became the key to the whole situation and to the establishment of a real peace. Europe had to be fed if order was to be restored and if European civilization, and, therefore, that of all the world, including our own, was to be preserved. America had again to assist in saving Europe and herself by supplying food, and that in great abundance. It was estimated that Europe would need to import at least 20,000,000 tons of bread grains alone, and that of this quantity 11,000,000 must come from the United States. It was obvious also that she would call for large imports of meats and fats, and that for months, until shipping expanded again, most

of these must be obtained from the United States. This burden America was able to assume because of the achievements of her farmers. The full story can not be told; only the outcome can be suggested.

1919 ACREAGES AND YIELDS. •

The farmers of the Nation, in 1919, planted an acreage in leading cereals greater by 33,000,000 than the prewar annual average (1910-1914), which, it is estimated, will yield 635,000,000 bushels more than the prewar average, and increased the number of milch cows over 1914 by 2,700,000, of other cattle by 8,500,000, of swine by 16,700,000, and of horses and mules by 1,000,000, or a total of 28,900,000. The planting operations for the year began before the fighting ceased. The call was still for more wheat. The Department suggested a maximum fall acreage of 47,206,000 acres, an increase of 12 per cent over 1918. There was actually planted 49,261,000, the largest acreage in the Nation's history, 6,960,000 acres more than in 1918 and 15,608,000 more than the five-year average, 1910-1914. The spring-wheat acreage was 22,593,000, while the winter and spring plantings combined amounted to 71,854,000 acres, or 7,200,000 more than the preceding record and 19,400,000 more than the prewar average. It is estimated that the yield will exceed that of 1918 by 1,000,000 bushels and will be the Nation's second record wheat crop. The estimated corn crop of 2,910,000,000 bushels will be 300,000,000 greater than that of 1918 and only slightly less than the high yields of 1915 and 1917.

If the fighting had continued and the season had been favorable, there is little question that the farmers of the country would have planted an aggregate crop acreage, during the winter and spring, greater than that for any preceding year in the Nation's history.

Forecasts of meat production for 1919, from partial reports of slaughtering, indicate that the record figure of last year—20,250,000,000 pounds—will be exceeded. The total will probably reach 21,000,000,000 pounds, as follows: Pork, 12,900,000,000 pounds, compared with 11,248,000,000 in 1918 and 8,769,000,000 in 1914; beef, 7,500,000,000 as against 8,500,000,000 in 1918 and 6,079,000,000 in 1914; and mutton, 600,000,000 pounds as against 537,000,000 in 1918 and 739,000,000 in 1914.

A rough estimate, based upon the number of milch cows and the census average of milk production per cow, indicates that the number of gallons of milk produced in 1919 will aggregate 8,495,000,000, or 57,000,000 more than in 1918 and 1,029,000,000 more than the average for 1910-1914. The figures for poultry and egg production have not been accurately ascertained, but it is roughly estimated, upon the basis of reported increases from one census to an-

other, that egg production in 1919 will aggregate 1,957,000,000 dozen, as against 1,921,000,000 in 1918 and 1,774,000,000 in 1914, and that the number of poultry raised on farms will approximate 600,000,000.

EXPORTS.

The exports of foodstuffs, enormous during the war, rose greatly between the armistice and midsummer. The annual average exports of important cereals for the five years preceding the war were 162,000,000 bushels. They rose to 517,000,000 in 1915 and aggregated 448,000,000 in 1919. Dairy products, of which 25,000,000 pounds were exported on the average during the five-year period before the war, increased in volume to 102,400,000 pounds in 1915, 217,500,000 in 1916, 352,000,000 in 1917, 592,000,000 in 1918, and 781,000,000 in 1919; while the exports of meat and meat products were 1,291,000,000 pounds for the five-year average before the war, 1,500,000,000 in 1915, 1,800,000,000 in 1916, 2,300,000,000 in 1918, and 3,300,000,000 in 1919.

The following tables may facilitate the examination of these essential facts:

Acreage of crops in the United States.

[Figures refer to planted acreage for winter wheat and rye.]

Crops.	1919 (unrevised estimate, October, 1919):	1918 (subject to revision). ¹	1917	1916	1915	1914	Annual average, 1910-1914.
CEREALS.							
Corn.....	102,977,000	107,494,000	116,730,000	105,296,000	106,197,000	103,435,000	105,240,000
Wheat.....	71,854,000	64,707,000	58,366,000	56,810,000	61,173,000	54,661,000	52,452,000
Oats.....	42,169,000	44,400,000	43,553,000	41,527,000	40,996,000	38,442,000	38,014,000
Barley.....	8,899,000	9,679,000	8,933,000	7,757,000	7,148,000	7,565,000	7,593,000
Rye.....	6,820,000	6,708,000	4,480,000	3,474,000	3,153,000	2,733,000	2,562,000
Buckwheat.....	943,000	1,040,000	924,000	828,000	769,000	792,000	826,000
Rice.....	1,091,300	1,112,770	980,900	869,000	802,600	694,000	733,000
Kafirs.....	5,183,000	5,619,000	5,153,000	3,944,000	4,153,000	.....	.....
Total.....	239,936,300	240,759,770	239,119,900	220,505,000	224,391,600	208,322,000	207,420,000
VEGETABLES.							
Potatoes.....	4,003,000	4,210,000	4,384,000	3,565,000	3,734,000	3,711,000	3,686,000
Sweet potatoes...	1,023,000	922,000	919,000	774,000	731,000	603,000	611,000
Total.....	5,026,000	5,132,000	5,303,000	4,339,000	4,465,000	4,314,000	4,297,000
Tobacco.....	1,774,300	1,549,000	1,518,000	1,413,000	1,369,900	1,224,000	1,209,000
Cotton.....	32,390,000	35,890,000	33,841,000	34,985,000	31,412,000	36,832,000	35,330,000
Grand total ..	279,126,600	283,330,770	279,781,900	261,242,000	261,638,500	250,692,000	248,256,000

¹ Figures for 1918 are to be revised Dec. 12, 1919.

² Excluding grain sorghums.

Production in the United States.

[The figures are in round thousands, i. e., 000 omitted.]

Crop.	1919 (unre- vised estimate Novem- ber, 1919).	1918 (subject to revision).	1917	1916	1915	1914	Annual average, 1910-1914.
CEREALS.							
Corn.....bushels..	2,910,250	2,582,814	3,065,233	2,566,927	2,994,793	2,672,804	2,732,457
Wheat.....do....	918,471	917,100	636,655	636,318	1,025,801	891,017	728,225
Oats.....do....	1,219,521	1,538,359	1,592,740	1,251,837	1,549,030	1,141,060	1,157,961
Barley.....do....	198,298	256,375	211,759	182,309	228,851	194,953	186,208
Rye.....do....	84,552	90,183	62,933	48,862	54,050	42,779	37,568
Buckwheat.....do....	20,120	17,182	16,022	11,662	15,056	16,881	17,022
Rice.....do....	44,261	40,424	34,739	40,861	28,947	23,649	24,378
Kafrs.....do....	123,343	66,396	61,409	53,858	114,460	.....	.....
Total.....do....	5,518,816	5,508,833	5,681,490	4,792,634	6,010,988	4,983,143	4,883,819
VEGETABLES.							
Potatoes.....bushels..	352,025	400,106	442,108	286,953	359,721	409,921	360,772
Sweet potatoes.....do....	102,946	86,334	83,822	70,955	75,639	56,574	57,117
Beans (commercial).....do....	12,690	17,437	16,045	10,715	10,321	11,585	.....
Onions, commercial crop.....do....	10,784	13,396	12,376	8,562	7,664	(?)	.....
Cabbage (commercial).....tons..	388	516	475	255	671	(?)	.....
FRUITS.							
Peaches.....bushels..	51,327	34,133	45,066	37,505	64,097	54,109	43,752
Pears.....do....	13,628	10,342	13,281	11,874	11,216	12,086	11,184
Apples.....do....	144,429	169,911	163,117	204,582	76,670	253,200	197,898
Cranberries (3 States).....barrels..	546	343	249	471	441	644	.....
MISCELLANEOUS.							
Flaxseed.....bushels..	9,450	14,657	9,164	14,296	14,030	13,749	18,353
Sugar beets.....tons..	7,298	5,896	5,980	6,228	6,511	5,585	5,391
Tobacco.....pounds..	1,316,553	1,340,019	1,249,276	1,153,278	1,062,237	1,034,679	991,958
All hay.....tons..	103,544	90,443	98,439	110,992	107,263	88,686	81,640
Cotton.....bales..	10,696	12,041	11,302	11,450	11,192	16,135	14,259
Sorghum sirup.....gallons..	33,668	29,224	37,472	13,668	.....	.....	.....
Peanuts.....bushels..	44,966	54,434	52,505	35,324	.....	.....	.....
Broom corn (5 States).....tons..	51	58	57	39	.....	.....	.....
Clover seed.....bushels..	967	1,102	1,488	1,706	.....	.....	.....

¹ Excludes grain sorghums.² No estimate.*Number of live stock on farms on January 1, 1910-1919.*

[The figures are in round thousands, i. e., 000 omitted.]

Kind.	1919	1918	1917	1916	1915	1914	Annual average, 1910-1914.
Horses.....	21,534	21,555	21,210	21,159	21,195	20,962	20,430
Mules.....	4,925	4,873	4,723	4,593	4,479	4,449	4,346
Milch cows.....	23,467	23,310	22,894	22,108	21,262	20,737	20,676
Other cattle.....	44,399	44,112	41,689	39,812	37,067	35,855	38,000
Sheep.....	49,863	48,603	47,616	48,625	49,956	49,719	51,929
Swine.....	75,587	70,978	67,503	67,766	64,618	58,933	61,865

Estimated production of meat, milk, and wool.

[The figures are in round thousands, i. e., 000 omitted.]

Product.	1919	1918	1917	1916	1914	1909
Beef ¹.....pounds..	7,500,000	8,465,000	7,384,007	6,670,938	6,078,908	8,138,000
Pork ¹.....do....	12,868,000	11,248,000	8,450,148	10,587,765	8,768,532	8,199,000
Mutton and goat ¹.....do....	637,000	537,000	491,205	633,969	739,401	615,000
Total.....do....	21,005,000	20,250,000	16,325,360	17,892,672	15,586,841	16,952,000
Milk ².....gallons..	8,495,000	8,438,000	8,288,000	8,003,000	7,507,000	7,466,406
Wool (including pulled wool), pounds.....	308,459	298,870	281,892	288,490	290,192	289,420
Eggs produced ³.....dozen..	1,957,000	1,921,000	1,884,000	1,848,000	1,774,000	⁴ 1,591,000
Poultry raised ³.....number..	600,000	589,000	578,000	567,000	544,000	⁴ 488,000

¹ Estimated for 1914-1918 by the Bureau of Animal Industry. Figures for meat production for 1919 are tentative estimates based upon 1918 production and a comparison of slaughter under Federal inspection for 6 months of 1919 with the corresponding 6 months in 1918.

² Estimated for 1914-1919 by assuming 362 gallons as the average yearly production of milk per cow. This average is given in the census for 1909.

³ Estimated by assuming a constant increase since 1910.

⁴ Annual averages for 1910-1914: Eggs, 1,695,000,000 dozen; poultry, 522,000,000.

Exports of domestic foodstuffs and cotton from the United States.

[Reports of Bureau of Foreign and Domestic Commerce, United States Department of Commerce.]

Article exported.	Annual average, 1910-1914.	Year ending June 30--					1919		Three months, July to September, 1919.
		1915	1916	1917	1918	Amount.	Per cent of 1910-1914.		
Wheat.....bushels.....	56,913,228	259,642,533	173,274,015	149,831,427	34,118,853	178,582,673	313.8	35,651,158	
Wheat flour.....barrels.....	10,678,635	16,182,765	15,320,669	11,942,778	21,880,151	24,190,092	226.5	5,132,968	
Oats.....bushels.....	8,304,203	96,809,551	95,918,884	88,944,401	105,881,233	96,360,974	1,160.4	14,273,916	
Rye.....do.....	884,765	12,544,888	14,532,437	13,260,015	12,065,922	27,540,188	3,222.3	3,691,246	
Barley.....do.....	7,895,521	26,754,522	27,473,160	16,381,077	26,408,978	20,457,781	259.1	16,643,135	
Corn.....do.....	39,809,660	48,786,291	38,217,012	64,720,842	40,997,827	16,087,538	41.9	2,613,519	
Total 5 cereals, including flour.....do.....	161,831,264	517,360,227	411,258,518	386,880,263	317,933,492	448,484,568	.....	95,971,330	
Sugar.....pounds.....	70,976,908	549,007,411	1,630,150,863	1,248,908,286	576,415,850	1,115,865,524	1,572.2	333,452,731	
Dairy products:									
Butter.....do.....	4,277,955	9,850,704	13,487,481	26,835,092	17,735,966	33,739,960	788.7	4,416,051	
Cheese.....do.....	4,915,502	55,362,917	44,394,301	66,050,013	44,330,978	18,794,853	382.4	2,405,335	
Milk, condensed.....do.....	15,773,900	37,235,627	159,577,620	259,141,231	529,750,032	728,740,509	4,619.9	192,881,959	
Total dairy products.....do.....	24,967,357	102,449,248	217,451,402	352,026,336	591,816,976	781,275,322	.....	199,763,345	
Meat and meat products:									
Canned beef.....pounds.....	9,392,122	75,243,261	50,803,765	67,536,126	97,366,983	108,480,472	1,155.1	9,500,174	
Fresh beef.....do.....	29,452,302	170,440,934	231,214,000	197,177,101	370,057,514	332,205,176	1,127.9	24,041,841	
Pickled beef.....do.....	32,893,172	31,874,743	38,114,652	58,053,667	54,867,310	45,067,861	137.0	9,338,564	
Oleo oil.....do.....	280,224,505	80,481,946	102,645,914	67,110,111	56,648,102	50,092,322	21.1	18,626,949	
Bacon.....do.....	182,474,092	346,718,227	579,808,786	667,151,972	815,319,424	1,239,540,973	679.3	259,009,482	
Hams and shoulders.....do.....	166,813,134	203,701,114	282,208,611	266,656,551	419,571,869	667,848,019	400.4	105,809,800	
Pickled pork.....do.....	48,274,929	45,655,574	63,460,713	46,992,721	33,221,502	31,504,497	65.3	7,362,746	
Lard.....do.....	474,354,914	475,631,908	427,011,338	444,769,540	392,498,435	725,577,867	153.0	154,092,726	
Lard compounds.....do.....	67,318,857	69,980,614	52,843,311	56,357,493	31,278,382	131,750,503	195.7	19,030,447	
Total meat and meat products.....do.....	1,291,198,027	1,449,628,321	1,828,111,120	1,871,807,311	2,270,821,521	3,341,076,611	.....	696,812,729	
Cotton.....do.....	4,419,802,157	4,403,578,499	3,084,070,125	3,088,080,786	2,320,511,665	2,733,683,125	61.9	632,449,973	

Exports of live stock from the United States.

[Bureau of Foreign and Domestic Commerce, United States Department of Commerce.]

Kind.	Annual average, 1910-1914.	Fiscal year ending June 30—					Three months, July to September, 1919.
		1915	1916	1917	1918	1919	
	<i>Number.</i>	<i>Number.</i>	<i>Number.</i>	<i>Number.</i>	<i>Number.</i>	<i>Number.</i>	<i>umber.</i>
Horses.....	28,073	289,340	357,553	278,674	84,765	22,776	5,971
Mules.....	5,125	65,788	111,915	136,689	28,879	4,883	906
Cattle.....	88,225	5,484	21,287	13,387	18,213	18,376	20,803
Sheep.....	522,505	182,278	231,535	58,811	7,959	152,000	14,186
Swine.....	11,191	7,799	22,048	21,926	9,280	10,122	2,285

VALUES.

On the basis of prices that have recently prevailed, the total value of all crops produced in 1919 is \$15,873,000,000, compared with \$14,222,000,000 for 1918; \$13,479,000,000 for 1917; \$9,054,000,000 for 1916; \$6,112,000,000 for 1914; and \$5,827,000,000 for the five-year average, 1910-1914. These values represent gross production and not net returns to the producer. The value of live stock on farms in 1919 was \$8,830,000,000, compared with \$8,284,000,000 in 1918; \$6,736,000,000 in 1917; \$6,021,000,000 in 1916; \$5,890,000,000 in 1914; and \$5,318,000,000 for the five-year average, 1910-1914.

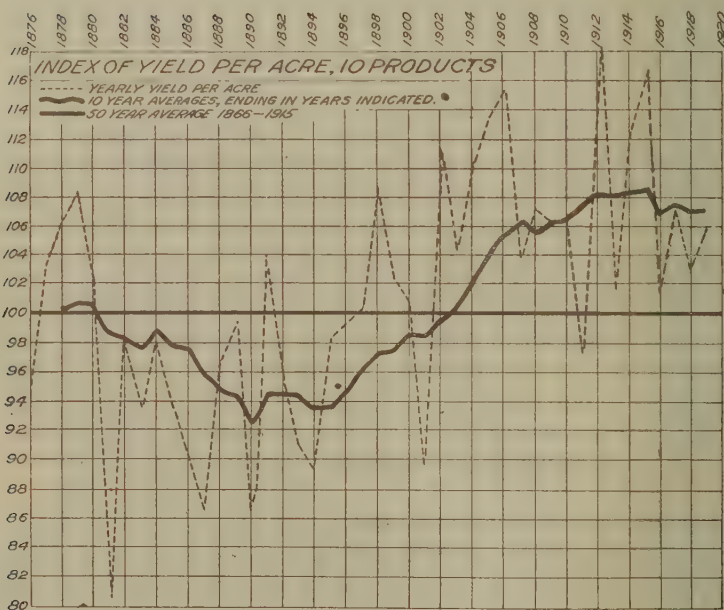
This increased financial showing, it is again necessary to emphasize, does not mean that the Nation is better off to that extent or that its real wealth has advanced in that proportion. Considering merely the domestic relations, the true state is indicated rather in terms of real commodities, comparative statements of which are given in the foregoing tables. The increased values, however, do reveal that the monetary returns to the farmers have increased proportionately with those of other groups of producers in the Nation and that their purchasing power has kept pace in the rising scale of prices.

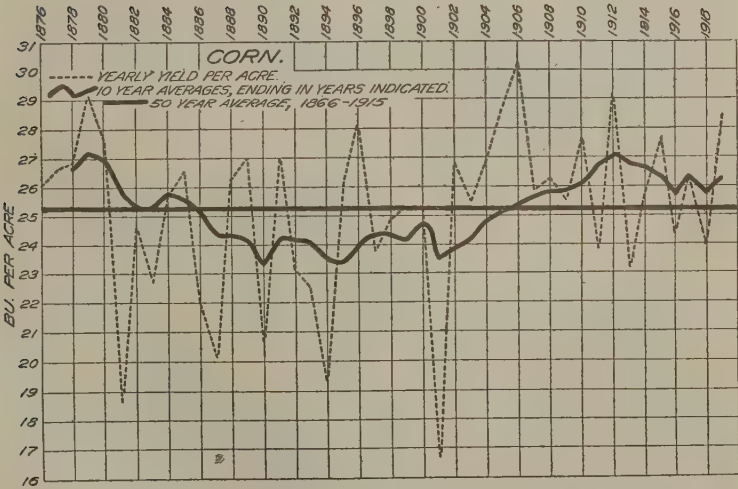
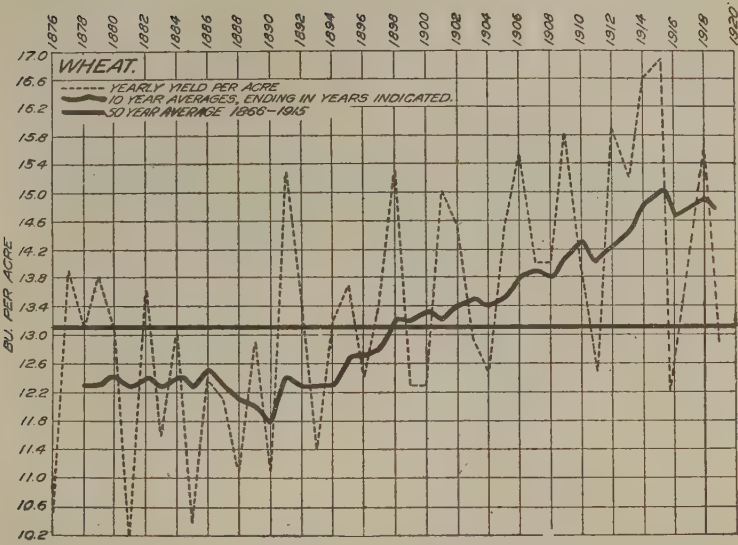
PROGRESS OF AMERICAN AGRICULTURE.

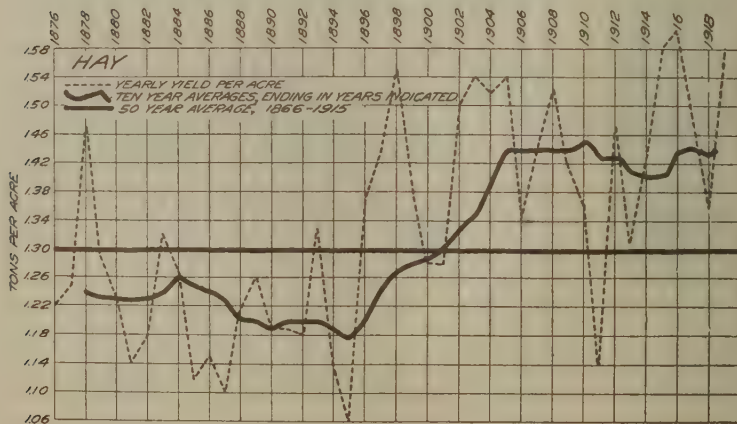
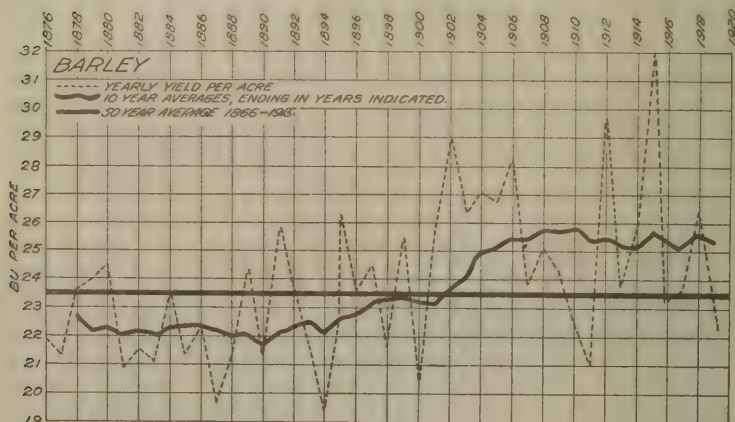
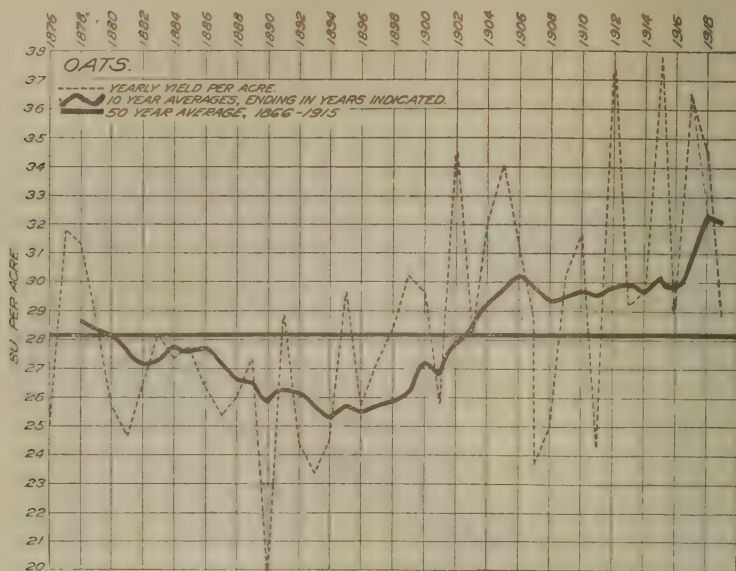
The results of agricultural operations during the war furnish guaranty of the ability of the present farm population of the country, with the area now in farms and in the existing state of agricultural science and practice, to meet the Nation's necessities for the near future if the requisite incentives are furnished. But there are reasons for further optimism. As has been repeatedly pointed out, we still have a large area of untouched tillable land. This is somewhat generally understood, but it is not so well known that, as the result of improved processes and better practices in all sections, there has been an upward tendency in the acre yields. As a mat-

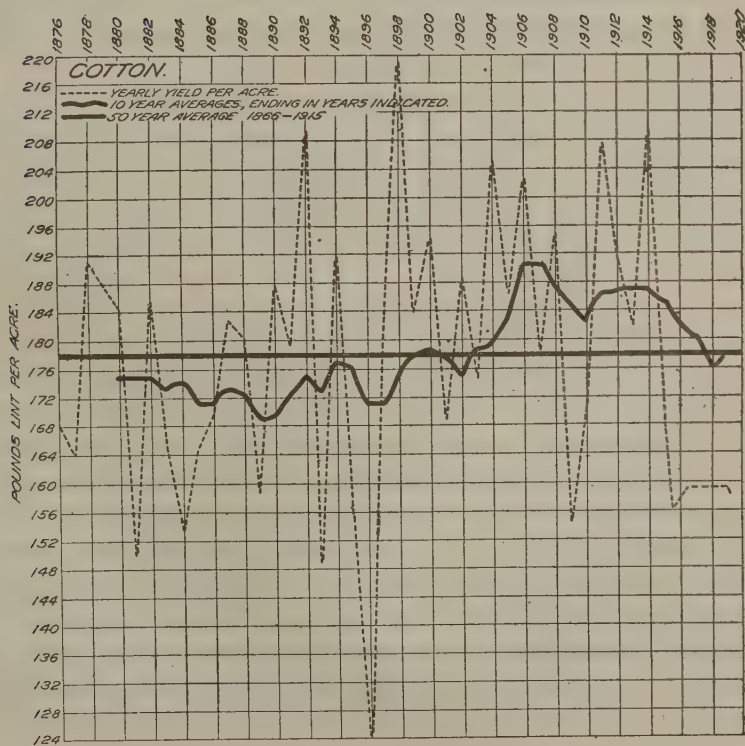
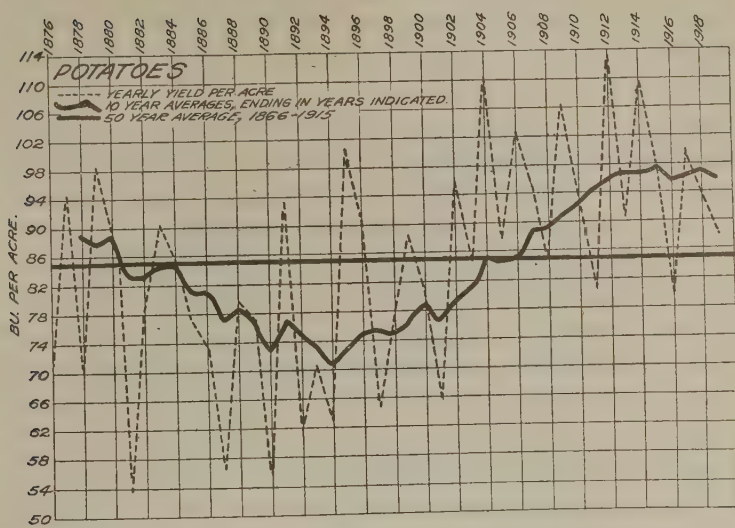
ter of fact, the view seems more frequently to be expressed that in this respect American agriculture has deteriorated. The facts disprove this, and in no part of the Union more strikingly than in the older regions, such as the New England and North Atlantic States.

Crop yields per acre in the United States show an upward tendency during the period for which we have reliable comparable statistics. The average rate of increase for the past 25 years has been about one-half of one per cent a year. This gain is not readily observed from one year to another, owing to the wide yearly fluctuations in yield. But when averages for a series of years are obtained, the effect of the seasonal variations is largely neutralized and the general trend is clear. The upward tendency is shown graphically in the following charts:









During the decades of the seventies and eighties, when there was a vast expansion of farm area in the West and crops were grown on a more and more extensive scale, the tendency of crop yields per acre was downward. Since the early nineties, however, the movement has been upward.

In the decade of the eighties, that is, for the 10 years ending with 1890, the average yield per acre of wheat in the United States was 11.84 bushels; for the past 10 years, that is, for the 10 years ending in 1918, it was 14.87—an increase of 25 per cent.

For the 10 years ending in 1890 the average yield of corn in the United States was 23.43 bushels; in the 10 years ending in 1918 it was 25.81—an increase of 10 per cent.

The oats yield in the 10 years ending in 1890 averaged 25.92 bushels, but in the 10 years ending in 1918 it was 32.17—a gain of 24 per cent.

The potato crop averaged 72.97 bushels per acre for the 10 years ending in 1890, and 96.84 for the last 10 years—an increase of nearly one-third.

By a like comparison, it may be observed that the hay yield rose from 1.193 tons per acre to 1.432—an increase of 20 per cent.

Cotton, notwithstanding the ravages of the boll weevil, increased from an average of 169.78 pounds in the decade ending in 1890 to 175.73 in the last decade—a gain of $3\frac{1}{2}$ per cent.

Other field crops have likewise shown greater yields. The average increase per acre of all crops in the 10 years ending in 1918, compared with the 10 years ending in 1890, was about 16 per cent.

The tendency toward enlarged output per acre is general throughout the United States; it is not due to a shifting of production from one section to another. For example, in the old agricultural State of New York the increases for the two periods mentioned above were as follows: Corn 24 per cent, wheat 44, oats 21, barley 24, buckwheat 43, potatoes 30, hay 10, average of all (weighted) 18 per cent. The facts for the New England States may appeal to many as even more striking and significant. For the six New England States, the following gains are shown in the 10-year period, 1909–1918, over the average for 1866–1875: Corn 33 per cent, wheat 63, oats 25, barley 27, rye 27, buckwheat 17, potatoes 27, hay 24, and all field crops 25 per cent; and for the 10 years, 1909–1918, over the average for 1881–1890: Corn 38 per cent, wheat 60, oats 24, barley 29, rye 44, buckwheat 45, potatoes 69, hay 23, and all field crops 26 per cent. For convenience of comparison, the accompanying table is inserted:

Comparison of crop yields in six New England States.

Crops.	Percentage increase in average yields per acre during 10 years, 1909-1918, over—	
	10-year average, 1866-1875.	10-year average, 1881-1890.
Corn.....	33	38
Wheat.....	63	60
Oats.....	25	24
Barley.....	27	29
Rye.....	27	44
Buckwheat.....	17	45
Potatoes.....	27	69
Hay.....	24	23
All field crops (weighted).	25	26

The gains noted are real; that is, they are not due to changes in statistical method. They are observed in the official statistics of most foreign countries, as well as in those of the United States.

The increased production per acre shown is due, in considerable measure, to the practice of better agricultural methods, including the use of more efficient farm machinery; better knowledge and fuller adoption of crop rotations; planting of crops better adapted to prevailing climatic conditions; development and adoption of varieties more resistant to plant diseases and insect pests; more general application of disease and insect control measures; increased and more intelligent use of fertilizers; and improved efficiency in crop production generally.

FOREIGN YIELDS ALSO INCREASED.

Not only in the United States, but in most civilized countries of the world, the yield per acre has been tending upward in recent years. This is noted in respect to wheat in practically all wheat-growing countries. If we compare the average wheat yields per acre in the 10-year period, 1891-1900, with those in 1901-1910, we find that in the United Kingdom there has been an improvement of 6 per cent, that is, from 30.1 to 31.9 bushels; in the Netherlands, of 19 per cent, or from 27.7 to 33; in New Zealand, of 28 per cent, or from 24.6 to 31.5; in Sweden, of 14 per cent, or from 24.2 to 27.6; in Germany, of 23 per cent, or from 23.6 to 29.1; in Ontario, of 12 per cent, or from 19.4 to 21.8; in Manitoba, of 7 per cent, or from 17 to 18.2; in France of 8 per cent, or from 18.1 to 19.5; in Hungary, of 3 per cent, or from 17.3 to 17.8; in Japan, of over 2 per cent, or from 17 to 17.4;

in Poland, of 3 per cent, or from 15.5 to 15.9; in Roumania, of 21 per cent, or from 14 to 16.9; in the United States, of 8 per cent, or from 12.9 to 13.9; in India, of 16 per cent, or from 9.7 to 11.3; in Caucasia, of 18 per cent, or from 9.5 to 11.2; in Russia, excluding Poland and Caucasia, of 14 per cent, or from 8.3 to 9.5 bushels. These countries are given in the order of their relative rank in yield per acre during the period 1891-1900. Satisfactory comparative data are not available for Argentina. Similar gains have been observed in other crops.

The average yields in the United States are frequently compared with the much larger yields in some European nations. In Belgium the average yield is about double that in the United States; in the United Kingdom, more than 60 per cent greater, and in France, nearly 15 per cent. It should be borne in mind, however, that the energy of each American farmer is spread over a larger area and that, although he produces less per acre, he produces much more per man. The total output of the average farmer is probably greater in the United States than in any other country in the world. Thus, in Belgium, with its intensive system of farming, only about 5.3 acres are cultivated for each person engaged in agriculture, whereas, in the United States, the corresponding figure is 27 acres. Taking both acreage and yield per acre into consideration, the average American farmer produces 2.5 times as much as the average Belgian farmer; 2.3 times as much as the English; 3.2 times as much as the French; 2.5 times as much as the German; and over 6 times as much as the Italian.

For many years to come the average yield per acre in the United States may be expected to increase, although the total output per man may diminish. This country has a long distance to go before it comes in sight of its limit of farm production. It can further increase its output of commodities by continuing to secure increased yields per acre. It has been estimated by experts that only about 15 per cent of the land in cultivation is yielding reasonably full returns. The opportunity is presented, as conditions warrant, to bring the remaining 85 per cent up to the point of fair yield. One of the objectives of all good farmers and of the agricultural agencies assisting them is to promote increased yields along economic lines by the further application of scientific knowledge and the adoption of improved practices. The path of progress is pretty well charted and the agricultural forces are moving along it with gratifying speed. However, the maintenance of satisfactory increases necessitates the continuance and enlargement of investigational work, particularly such as is required to insure fuller control of destructive plant diseases and insect pests.

FARM LAND PROBLEMS.

The Nation can further expand its output of commodities by cultivating the tillable land which at present is unused, estimated to be over 60 per cent of the total. But there has been no such full consideration of the policy which should be pursued in reference to the extension of the farm area as has been given to economical production. Since the Nation now retains but little land of ready availability, agricultural expansion will result mainly from efforts to utilize and to increase the productivity of farm lands now owned by individuals, corporations, and the States.

A number of important questions must be answered: How rapidly should new areas be developed? What means should be employed to bring new lands into use, so that settlers may achieve success, employ sound methods of husbandry, and establish a wholesome community life? What is the significance of the increase of tenancy and what may be done to establish a system of land tenure which will insure good farming and a sound and democratic foundation for American agriculture? What is the bearing of the increasing prices of land and the resulting speculation on the progress of agriculture and the welfare of the farmer?

EXPANSION OF AREA IN FARMS.

The expansion of the Nation's agriculture is limited by the supply of labor and capital available for farming purposes rather than by the scarcity of undeveloped lands. It is true that, in general, the best land is already in cultivation, but without question much of the remainder can be tilled when the country reaches the economic stage which would justify its utilization.

There are numerous fallacious opinions with respect to the need of extending the farm area. Many people, noting the prevailing prices of agricultural products, demand increased production and insist that the remedy lies in immediate and rapid expansion of the acreage in farms. Others, observing large tracts of unused land, deplore the great waste of our resources. Still others explain the movement of population from rural districts to cities by the non-availability of land, which they attribute to land monopoly, speculation, and other evils. The demand for farm products, unlike the demand for manufactured articles, does not expand rapidly to meet a large increase in supply. There is a tendency toward an equilibrium between urban and agricultural industry. If too much labor and capital are diverted from farming, the relative prices, and consequently the relative profits, of agricultural activity will increase, and there will be a tendency toward expansion. If this is excessive, however, relative prices and profits will tend to decrease and the

industry may suffer depression. The inelasticity of demand for farm products sets a very decided limit at a given time to the increase of population and capital profitably employed in agriculture.

It is not in the interest of producers or consumers to have large fluctuations in agricultural production. There is always danger of glutting the market and of serious loss. The aim rather should be to secure a steady flow of commodities of sufficient volume to supply an increasing demand at prices which will yield the farmer a decent wage and a fair profit on his investment. It seems difficult to get it into the minds of some people that farming is a business and must pay; that under modern conditions there can not be an unlimited number of farmers. There could be a larger proportion of farmers to total population if each farm were self-sufficient and produced no surplus of consequence, but to-day the average farmer produces many times what he consumes of some things and is dependent for his prosperity upon their profitable exchange for other articles which he uses. There should be, and in the long run there will tend to be, no more farmers in the Nation than are needed to produce the quantity of products which can be disposed of at a profit. There will be farmers enough if the business of farming is made profitable and if rural life is made attractive and healthful. The consumers must be willing to pay prices for farm products which will enable farmers to produce them and to maintain a satisfactory standard of individual and community life. The Nation also must be prepared to omit nothing to improve the countryside. It is of the first importance that satisfactory schools, with courses of study related to the problems of rural life, be provided, that good roads be constructed, and that adequate provision be made to give rural communities the requisite sanitary and medical services, including hospital facilities. When these requirements are met, we shall not have to concern ourselves as to the number of farmers and the adequacy of our agricultural production. There will then be no difficulty in retaining in the rural districts a sufficient number of contented and efficient people. What we need is not a "back to the land" propaganda, but an acceleration of the movement for the improvement of the countryside which will render the abandonment of farms unnecessary and the expansion of farming inevitable.

There is reason to believe that a considerable expansion in farmland area occurred during the war. The acreage devoted to the 19 principal crops increased 10.1 per cent from 1914 to 1918. Accordingly, the crop area per capita increased from 3.22 acres in 1914 to 3.33 in 1918, or 3.4 per cent. This expansion probably resulted in part from the use for crops of land normally devoted to other purposes, especially to pasture. However, it seems to indicate that the farming industry has more than held its own during the period.

This conclusion is confirmed by an increase not only in the per capita production of nearly all the important crops, but also, according to a recent report, in the number of cattle and swine per capita. Moreover, estimates for milk, eggs, and poultry indicate an increase in per capita production during the war. In view of these facts, it probably would be unwise to stimulate a large increase in the per capita farm acreage at the present time, especially where such an increase would have to be effected by utilizing land which is inferior or which would be made available at a heavy outlay for drainage, irrigation, or clearing. Apparently, therefore, American agriculture should consolidate the gains already made; prepare for the period of competition which is to be expected with the return of normal world conditions, principally by increasing, through sound and economical methods, the productivity of areas already under cultivation; and utilize the services of the most experienced and judicious agricultural leaders in determining where, when, and how to bring into cultivation and develop public and private unused land.

The best experts of the Federal department and of the agricultural colleges should make a careful investigation of the possibilities of utilizing land not now devoted to agriculture. In respect to the 200,000,000 acres of cut-over land, the 60,000,000 requiring drainage, and the 30,000,000 which may be irrigated, there is great variation from district to district as to the possibility of economic use. Distinctive regions should be fully studied with a view to assemble all existing data on productivity, cost of making the land available, present tenure and prices, type of agriculture best adapted to the conditions, possible returns, minimum size of farms capable of supporting families in reasonable comfort, minimum equipment needed at the beginning of settlement, sources of credit, and marketing and transportation facilities.

LAND SETTLEMENT.

At present various private agencies are engaged in promoting land settlement. Many of them are honest in intention, promise, and practice; others keep within the letter of the law but, through exaggeration and indirection of statement, create false impressions in the mind of the settler. Many violate no canon of fair business practice, but their interest is in profits and they do not pursue a policy calculated to develop a profitable and wholesome community life. Only a few have made careful studies of the conditions of successful settlement and developed their business with a view to the settlers' progress and success. Practically all are seeking to realize the highest possible price for their undeveloped holdings, and the settler is compelled to face the problem of adjustment to pioneer conditions while carrying a burden of land value

which often represents, in part, the capitalization of a future increase in earning power.

The intending settler of small means is rarely able to distinguish between the good and bad methods of selling land in new regions. The more unscrupulous the land company the more lurid are its advertisements and the more extravagant its promises. Settlers often are induced to invest all their savings in land not suitable for successful farming, to purchase more land in relation to the capital available for development than they should, or to undertake projects the cost of clearing or reclamation of which will prove to be prohibitive. The results, in many instances, have been tragic failures after years of incredible hardships, waste of capital and of human lives, discouragement of intending settlers, and injury to the business of legitimate and well-meaning land concerns.

It would be desirable if governmental agencies, by systematic aid, should furnish reliable information to those seeking farms, should take particular pains, through their agricultural machinery, to give new settlers very special assistance and guidance, and, where conditions are favorable, should aid in the development of well-considered settlement plans.

TENANCY.

The increase of tenancy has become the subject of deep concern to thoughtful students of rural conditions. The tenant, on an average, remains on the same farm only about one-sixth as long as the owning farmer. Consequently, he often manifests little interest in the improvement of the farm and in the progress of the community. A certain proportion of tenants is normal and may not be unwholesome. Many farm owners, because of age or infirmity, find it necessary to retire. Their farms are temporarily operated by their sons or other relatives who subsequently may become owners through inheritance or purchase. Large numbers of young men with little capital find tenancy a convenient stage in their progress to ownership. Certain local studies reveal the fact that nearly two-thirds of the farm owners who operate their farms have passed through this stage. Frequently it serves as a useful period of apprenticeship in farm management before the heavier financial burdens of ownership are assumed.

In a great many cases the farmer has not yet acquired sufficient experience as a manager to operate his farm efficiently without the assistance of the landlord. In some instances, also, the tenant has been reared in an environment characterized by lack of thrift, self-restraint, and systematic industry. He may not have the general intelligence or technical knowledge to stand alone in the management of a farm. Where these personal limitations exist the solution of the problem lies in education, training, and the development of

systematic habits of industry and thrift rather than in radical changes in the system of tenure.

Since there will continue to be a certain number of tenants, every effort should be made to change the conditions of leasing so as to improve the methods of agriculture, increase the period of occupancy, and insure a fair division of returns; and the States should provide by law for a system of compensation by owners to tenants for unexhausted improvements and set up the necessary administrative machinery. Such arrangements have prevailed in England for many years to the benefit of all concerned.

Although landlords may, and often do, play an important part in financing and in operating farms, there are large numbers who live at a distance and who contribute nothing toward their efficient utilization or improvement. Moreover, they often fail to interest themselves in promoting the progress of the community in which their land is situated, although they benefit by such progress. Land, however, is peculiarly important to all the people and the welfare and prosperity of the community, as well as its economic and social progress, depend so vitally on its use and the relationship of the population to it that serious thought must be given to the problem of limiting absentee ownership.

The endeavor to develop a more harmonious and efficient relation between tenant and landlord and to restrict absentee landlordism does not obviate the necessity of taking measures to retard the increase of tenancy. The road to farm ownership should be made as smooth as possible. This may be accomplished in part by providing more liberal credit facilities. The Federal Farm-Loan System has furnished a means whereby farmers may conveniently borrow under the conservative conditions of first-mortgage security. However, an analysis of the amount loaned shows that only a small proportion of the net proceeds was ostensibly obtained for the purchase of farms.

In some sections the growth of tenancy has been stimulated by the fact that the price of land has been higher than the level justified by current earnings. Consequently, it has been more profitable to rent than to buy unless one wished to speculate in land values. Recently there has been a tendency for prices to increase with extreme rapidity. There has been active, and in many respects unwholesome, speculation which has profited mainly the real estate agents. A heavy charge, therefore, has been placed against the earnings of the land on the assumption of the continuance of war prices. The advancing price of land is especially serious in the case of the undeveloped regions of the country. It constitutes an obstacle to development, for the actual settler is compelled to assume at the outset unduly heavy interest charges.

EXTENSION OF FORESTRY.

The continued dissipation of privately owned forests in every timber-producing region of the country is a matter of grave concern. The public does not fully realize its seriousness. If the area having little or no value for other than forest purposes is not protected, much of it will become practically nonproductive. Millions of acres in the older parts of the country where supplies of timber are needed by the communities have become almost valueless. Where the land is not valuable for agriculture large-scale lumbering operations are followed by local industrial depression, the timber industries migrate, population decreases, farmers lose their local market, taxable values decline, schools and roads deteriorate, and the economic and social life of the community suffer.

The problem presented is very difficult. Public forests are confined to relatively limited areas, except in the West. These will by no means supply the future needs of the country. At present the greater part of the lumber produced annually is cut from private lands on which the appearance of new growth is at best a matter of accident, is likely to be long delayed, or may never occur. Without concerted action under public cooperation and direction the problem will not be solved. Private initiative can not be depended upon to secure the requisite conservation.

The preservation of forests in all forest regions is of immediate concern and importance to farmers. Timber is an important farm crop. Farm woodlands comprise about 20 per cent of the farm area of the country. At the last census the value of the products from them was greater than that of the potato crop and nearly double that of the tobacco yield. Forestry, therefore, must be assigned a place in farm management. Farmers also are vitally concerned with national forestry problems. They consume more wood than any other group and they are interested in seeing that there is available, at reasonable prices, a continuous supply of lumber and other forest products. A sound forestry policy does not conflict with agricultural settlement. In fact, it facilitates the cultivation of land suitable for agriculture, and also seeks to secure the proper handling of existing forests and the reforestation of denuded regions. On the other hand, forest devastation retards agricultural development.

NECESSARY STEPS.

Certain things seem clear. Fire is a great menace not only on forested but also on cut-over areas. Adequate protection, therefore, should be required of all owners. The public, through both the State and Federal Governments, should cooperate in organizing this service and should share the cost of maintaining it. It should also adopt such practical measures as may be necessary to bring about the dis-

continuance of all practices which result in turning the forests into wastes, and should aid private owners to perpetuate their forests by proper management. A well-balanced policy requires a much larger program of publicly-owned forests than at present. The acquisition of forest lands by the Federal Government is now proceeding under the Weeks forestry law. The total area approved for purchase to date is 1,835,298 acres. The continuation of the policy is sought by the National Forest Reservation Commission, and an estimate of an appropriation of \$10,000,000 will be placed before the Congress. And, furthermore, the consolidation of National Forest areas through exchange with private owners should be accelerated. There are now pending no less than 25 bills authorizing exchanges, and the enactment of a general law would be in the public interest. There is a growing demand for additions to the National Forests from the public lands in the States where such action is possible only through legislation. Recently a law authorizing the addition of 1,000,000 acres to the National Forests in central Idaho has been enacted.

Good forestry practice rests upon the possession of full and accurate data. Our present knowledge of the methods of securing the largest yields is inadequate. There is need of further information regarding the amount, quality, and distribution of existing timber supplies. A detailed inventory of our present resources and a survey of present and prospective needs are essential for constructive planning.

FARM MANAGEMENT AND FARM ECONOMICS.

Until comparatively recently studies in farm economics were neglected. In the last 10 or 15 years it has come to be recognized that the prosperity of the farmer depends as much upon good business methods as upon his practices in plant culture and animal husbandry. In 1906 the Department of Agriculture inaugurated investigations in farm management, which remained in the Bureau of Plant Industry until 1915, when the Office of Farm Management was established as a branch of the Office of the Secretary. During the latter part of the calendar year 1918 steps were taken to reorganize the work. At my request, a committee composed of recognized authorities on farm management and agricultural economics made a thorough study of the activities of the office, not only with a view to enlarge the scope and increase the efficiency of the work but also to outline definite methods of procedure to be followed in the study of farm-management problems, and especially the cost of producing agricultural products. The members of this committee were: G. F. Warren, professor of agricultural economics and farm management, State College of Agriculture, Ithaca, N. Y.; Andrew Boss, chief of the division of agronomy and farm management, State College of Agriculture, St. Paul, Minn.; H. C. Taylor, head of the department

of agricultural economics, College of Agriculture of the University of Wisconsin, Madison, Wis.; J. A. Foord, professor of farm management, State College of Agriculture, Amherst, Mass.; J. I. Falconer, professor of rural economics, State College of Agriculture, Columbus, Ohio; R. L. Adams, professor of agronomy, State College of Agriculture, Berkeley, Calif.; and G. I. Christie, Assistant Secretary of Agriculture and Director of Extension in Indiana.

This committee submitted a report to me, which I approved and which has been published as Circular No. 132 of the Office of the Secretary. It not only outlined the field of work of the Office of Farm Management but also recommended that its name be changed to Bureau of Farm Management and Farm Economics, and that the investigations conducted by it be carried on in close cooperation with the agricultural colleges and experiment stations in order to prevent duplication of effort, to promote the development of farm management activities in the various States, and to unify the methods and improve the general character of all farm management work. On the basis of these recommendations, separate conferences were held for the purpose of indicating in greater detail the activities proposed by the reorganization committee, and especially to consider the projects relating to cost of production, farm organization, land utilization, and farm life.

These conferences resulted in the following approved projects:

(1) **COST OF PRODUCTION STUDIES.**—The value and importance of such studies are set forth clearly in the report of the reorganization committee, as follows:

Cost of production studies are of value to the individual farmer and, at the same time, are helpful in ascertaining the economic status of farming as an industry.

From the standpoint of the individual farmer the primary purposes are:

- (1) To record the details of the farm business for reference.
- (2) To give an insight into the elements and interrelations of the different farm activities.
- (3) To furnish information that may enable the farmer to reduce costs or otherwise increase profits.
- (4) To make possible a comparison of the profitableness of the different enterprises and combinations of enterprises.

The records secured by cost of production studies give data for analyzing the farm business, and thus are of fundamental importance in the whole program of agricultural research and education. The results of such studies on a number of farms where a given type of farming is practiced are useful not only to the farmers from whose farms the results were obtained, but are of value in showing other farmers how to improve their methods.

From the standpoint of the public, cost of production studies provide the facts which give a basis for intelligent judgment upon the probable effects of any given legislation or other public activity upon the farmer as a producer and as a citizen. Cost of production studies are therefore one of the means of providing the basic facts needed by legislators and price commissions in comparing the profits of competing lines of production and estimating necessary price.

(2) **FARM-LIFE STUDIES.**—These studies are to be conducted with a view to make living conditions in the home and in the community more satisfactory to the farm family. They will cover the following topics: Rural home life; opportunities for social contacts in typical rural communities; the relation of educational and religious institutions to farm-life problems; problems relating to geographical population groups, such as the relation of urban and rural populations, the shifting of rural populations, race elements in rural districts; social aspects of tenancy and landlordism; rural organizations, their efficiency, scope, causes of success and failure; social aspects of various types of farm labor—the married and unmarried farm hand, seasonal and child labor; the relation of various forms of disability—the aged, illiterate, defective, dependent, delinquent—to farm-life problems; and the social consequences of local disasters due to natural causes, as well as of thrift and agencies for promoting it.

(3) **LAND ECONOMICS (LAND UTILIZATION)**, involving the consideration of land resources, values, ownership and tenancy, settlement and colonization, and land policies.

(4) **FARM ORGANIZATION.**

(5) **FARM FINANCIAL RELATIONS.**

(6) **FARM LABOR STUDIES.**

(7) **AGRICULTURAL HISTORY AND GEOGRAPHY; and**

(8) **DEMONSTRATION ACTIVITIES.**

The supervision of the task of executing the new program was assigned to Dr. H. C. Taylor, who was appointed Chief of the Office of Farm Management. Dr. Taylor, before accepting this position, owned and operated a farm in Wisconsin and also was head of the department of agricultural economics in the college of agriculture, University of Wisconsin. The department also secured the services of Mr. Francis W. Peck, of the University of Minnesota, who has had wide experience in studies of the cost of producing farm products, to take charge of the enlarged activities in this important field; of Dr. L. C. Gray, of Peabody College, to direct the work relating to land economics; and of Prof. C. J. Galpin, of the college of agriculture of the University of Wisconsin, to supervise the farm-life studies. This is merely a part of the plan to secure some of the best available minds in the country to direct the work relating to farm management and farm economics.

APPROPRIATIONS REQUIRED.

Arrangements promptly were made to develop the activities of the Office of Farm Management along the lines suggested by the reorganization committee. As it was clear that existing funds were inadequate, I submitted to the Congress, on May 23, 1919, a revised estimate calling for appropriations, during the fiscal year 1920, aggregating

\$611,990, compared with \$305,090 during the fiscal year 1919, an increase of \$306,900. Aside from statutory salaries, it was proposed to allot the appropriation to the following lines of work, in the amounts indicated:

Cost of production studies.....	\$245, 000
Farm organization.....	53, 600
Farm finance and farm relations.....	21, 560
Agricultural history and geography.....	29, 200
Land economics (land utilization).....	112, 920
Farm-life studies.....	20, 560
Demonstration activities (extension work).....	32, 820

It was hoped that the necessary additional funds would be included in the agricultural appropriation bill for 1920, which was then pending. Unfortunately, however, Congress did not take favorable action on the proposal. It not only did not grant the increases recommended but inserted a proviso in the bill which restricts the amount that may be expended on cost of production studies during the present fiscal year to \$23,873.

Although the funds at the disposal of the office were small, every effort has been made to carry out the reorganization program along the lines indicated. I am renewing, in the estimates of the department for the fiscal year 1921, the recommendation that approximately \$611,900 be provided, and that the name of the present Office of Farm Economics.

Having secured the best experts available to direct the principal Farm Management be changed to Bureau of Farm Management and activities of the office, I am confident that the work now under way and proposed, if the necessary funds are appropriated, will be executed in a highly satisfactory way, and that facts and information of immense value to individual farmers in dealing with their own problems, and also to the Nation for its guidance in considering broad agricultural policies, will be obtained and made available.

CROP AND LIVE-STOCK REPORTING SERVICE.

Accurate and complete statistics are prerequisite to the satisfactory consideration of any problem. They are of overwhelming importance to the millions of people interested in rural life, and especially those charged with the responsibility of aiding, by legislative and administrative processes, the successful development of our great agricultural industry. Suggestions as to the direction of production and plans to improve marketing and distribution wait upon them, and in any national crisis they are essential to the intelligent handling of the Nation's food problems. In this direction, as in many others, the war has brought home in very direct fashion the need of improvement.

The value of dependable information on acreage, crop yield, number of live stock, and farm surpluses can not be overestimated. The Bureau of Crop Estimates has slowly developed an organization to secure and verify many valuable data. It is now necessary to extend it. The time has arrived for placing the work in all the States on a county basis. It is important that the live-stock and feed-reporting service be enlarged, that farm surpluses be ascertained, and that information regarding foreign crop and live-stock production be more fully secured and reported. It is peculiarly urgent that this be done at the present time. The 1920 census is about to be taken. It will furnish new base lines, and the department should be in a position, by reason of an improved service, to supply the country each year after the census with as full and accurate data as possible.

Estimates to make it practicable for the department to execute the enlarged program will be laid before the Congress for consideration at its regular session. If they are approved, the field force of the bureau will be strengthened by placing an assistant field agent and a clerk in each State. Additional specialists also will be appointed to collect, interpret, and present information regarding special crops and classes of live stock. The bureau then will be in a position to report for the Nation as a whole, for each State, and for each county, monthly or oftener if necessary, acreages to be planted; surpluses or deficiencies of seed, fertilizer, labor, and farm machinery; acreages actually planted; progress of farm work; acreages abandoned and harvested; damage from weather conditions, insects, and plant diseases; condition of crops and forecasts of production; yields per acre and production at or near harvest; acreages and yields of principal varieties of each crop; disposition and utilization of the crops produced; marketable surpluses and stocks on farms; prices received by farmers as distinguished from market quotations; prices farmers pay for supplies, machinery, and equipment; hours and wages of farm labor; and the foreign situation. These reports will cover about 70 crops, including such special items as vegetables, nuts, fruits, seed, oils, forest products, and nursery stock, for all which adequate reports have not been available, except in the census years.

Likewise, there will be given the number of horses, mules, dairy cattle, beef cattle, swine, sheep, goats, and poultry, by age and sex classifications corresponding with the census enumeration of January, 1920; of pure bred animals of each kind; of those bred, born, or brought on to the farm; of those sold, slaughtered, or lost through disease, exposure, or other causes; of those remaining on hand and on feed; the condition of the various classes of animals; farm prices; and the feed situation, including the carrying capacity of pastures

and ranges, the number of silos, the quantity of silage and other forage available, as well as the domestic meat, dairy, poultry, wool, and hide production, and the foreign situation.

Available foreign crop and live stock estimates will be secured and published, especially for countries of deficient supply and those of surplus production in competition with the United States, and periodical world balance sheets will be prepared, showing for the principal countries of the world the production requirements, imports, exports, and net deficiencies or surpluses of the major crops and classes of live stock.

It is proposed to establish intimate cooperative relations with State departments of agriculture and State assessors. In this way greater accuracy will be secured and the aggregate expense to the States and the Nation reduced. As the value of reports depends not only on their completeness and accuracy but also on their quick availability, they will be issued very promptly and more frequently, summaries will be released on dates of issuance, and the Crop Reporter will be changed from a monthly to a weekly basis.

VALUE OF COMPLETE ESTIMATES.

It need scarcely be pointed out that county estimates are of great importance to the work of the county agents and the extension service in each State, to manufacturers and business men who supply farmers with equipment and machinery, to banks which furnish funds for financing crop production and movements, and to transportation companies for supplying cars when and where needed to move crops. They have already been made in a number of States. Preliminary estimates of acreages intended to be planted will enable farmers to determine whether their plans should be modified. Estimates of surpluses or deficiencies in the supplies of seed, fertilizers, and farm help tend to equalize both distribution and prices and to insure adequate farm production. Estimates of acreage, yield per acre, and production of each principal variety of a given crop, in addition to total production of the entire crop, will show the relative adaptability and productivity of varieties, and therefore will be of assistance not only to farmers, but also to seedsmen and to crop specialists and plant breeders of the State experiment stations and of the Federal Department of Agriculture. Those of crop damage by counties from insect pests and plant diseases will enable the entomologists and plant pathologists to work more intelligently in developing and applying remedies. Those of marketable surpluses on farms, or the portion of the crop sold from the farm and entering the channels of trade, will facilitate the satisfactory marketing and distribution of surplus production. Such estimates have been

made for apples, peaches, potatoes, and truck crops, and they were promptly and effectively utilized by growers and marketing agencies.

Perhaps the most important feature of the enlarged program is that relating to live stock, which represents not only a farm investment of more than \$10,000,000,000 but also constitutes the meat supply of the Nation, a considerable portion of the export trade, a very important factor of successful farm management and economy, and 50 per cent of all farm sales. Yet for this important industry the bureau, with its inadequate facilities, has been able to estimate, once a year, only the gross number of animals on farms, the number of brood sows, and the total losses from disease and exposure. No attempt has been made in the past to estimate dairy and poultry production between censuses, the annual value of which amounts to approximately \$3,000,000,000. The great losses occurring yearly from drought and feed shortage in portions of the Great Plains and in limited areas of other sections might, to a considerable extent, be reduced by having definite and detailed information regarding the feed situation.

The expenditure of money for the execution of this program will clearly be an investment, which should be made without delay in order that agricultural and business interests may have the benefit of the improved service during the period of readjustment. It should be borne in mind also that the proposals are in no sense experimental. Their feasibility and practical value have been fully demonstrated.

MARKETING AND DISTRIBUTION.

In the field of distribution, as well as in the field of production, the farmers of the Nation must assume the main tasks of improvement. The Government should furnish all possible aid in the way of information and suggestion, create favorable conditions under which production and distribution may take place, and especially see that the channels of trade are open and that abuses do not exist.

The present time is especially fruitful of proposals of a large and novel nature designed quickly to solve marketing problems. Recently measures have been introduced into the Congress proposing a private or a governmental agency of national range, with State and county subdivisions, to supervise, or even to direct, the handling or marketing of the Nation's farm products. The probability is that an undertaking of such character would break down of its own weight. There is no question that everything which can legitimately be done to eliminate waste in marketing and to promote orderly distribution should be done. But the views of the most experienced students of the matter seem to be that we must approach the problem in simpler

terms, work along lines which have clearly proven to be feasible, and promote existing tendencies and practices.

Certainly, we can proceed further, by State, Federal, and individual action, in standardizing the production, the handling, and the packing of farm products, and in promoting the use of standard containers and proper storage on farms, in transit, and at market centers. We can continue to furnish assistance in the preparation and installation of accounting systems, and more extensively and accurately gather and furnish to the farmers of the Nation all pertinent statistical information. I need scarcely emphasize the paramount importance of making available daily to producers facts as to market prices, supplies, and demands. The market news services of the Department of Agriculture have already clearly proved their value. The department now conducts and operates an inspection service on fruits and vegetables covering 164 markets. It publishes reports on the supply, commercial movement, and prices of most of the important products and, in cooperation with 14 States, is issuing exchange marketing lists which make known to county agents, breeders, and feeders in these States, where surpluses of live stock, feeds, and seeds are to be found. It is estimated that last year, through such service, the farmers in Iowa alone made local exchanges having an estimated value of \$1,500,000.

COOPERATIVE ASSOCIATIONS.

Particularly must the Federal and State agencies omit nothing to promote farmers' cooperative associations along right lines. Already, within a generation, many such bodies have appeared and rapidly expanded. It is estimated that they now market annually approximately \$1,500,000,000 worth of commodities. They are of very diverse forms and sizes. For the most part, where they have been successful they have centered their activities on some one product, or on related products, in a given area. The indications are that, with the continued success of these enterprises and with the proper educational effort and direction, they will develop even more rapidly in the future. Through bulletins, news articles, and lectures, the Department of Agriculture has endeavored to stimulate these efforts. It has furnished suggestions for State legislation governing their organization and, in cooperation with 23 States, it has employed trained specialists to advise extension workers, including county agents, and others, with reference to cooperative marketing.

As I have said, the rational program would seem to be to expand these activities, which have clearly demonstrated their value, to follow the scent as it were, and further to develop the machinery through which increased assistance may be furnished. There should be in every State one or more trained market specialists of the De-

partment of Agriculture, working in cooperation with the proper State authority, to stimulate cooperative enterprises and to aid farmers in their marketing work by helpful suggestions as to plans and methods. These experts could very effectively aid the extension workers. County agents generally have the assistance of specialists in many other lines, but at present they have not the requisite aid in distribution. They can not be expected to be expert in all agricultural matters or to be omniscient. The department is requesting increased funds to make this extension possible and will take the necessary action promptly if the appropriations are made.

GOOD ROADS.

Good roads are essential to the prosperity and well-being of urban and rural communities alike. They are prerequisite for the orderly and systematic marketing of farm products, for the establishment of satisfactory rural schools, and for the development of a richer and more attractive rural life. Recognizing these facts, the Federal Government, through the passage of the Federal aid road act in 1916, inaugurated a policy of direct financial participation in road-building operations in the various States. This act appropriated \$75,000,000, to be matched by an equal amount from the States, for the construction of rural post roads over a period of five years, and \$10,000,000—\$1,000,000 a year for 10 years—for roads within or partly within the National Forests. It required each State to have a responsible central highway department with the requisite powers and funds. All the States have complied with the terms of the act, although it was necessary for them to enact additional legislation, or to amend their constitutions; to provide sufficient funds to match the Federal apportionment; and to strengthen existing central highway bodies or to create new agencies.

When these preliminary steps had been practically completed and the department and the States were about ready to proceed vigorously with the actual construction of roads, the United States entered the war. It soon became necessary greatly to curtail highway building because of the difficulty of securing transportation, construction materials, and the requisite services. After the armistice was signed, arrangements promptly were made for the active resumption and vigorous prosecution of road work in all sections of the country, not only with a view to repair the damage wrought by the heavy traffic forced upon our highways during the war, when maintenance operations were seriously interfered with, but also to provide adequate transportation facilities to serve the increased needs of agriculture and industry. Recognizing also that road-building activities would furnish suitable employment for many unemployed men during the period of transition from war to peace, the

Congress at its last session, accepting the recommendation of the Department of Agriculture, appropriated \$209,000,000, in addition to the \$85,000,000 provided by the original act, for the extension of road construction in cooperation with the States, and also made some important amendments to the act. The definition of the kind of roads that can be constructed was greatly broadened and the limitation on the Federal contribution for any one road was increased from \$10,000 to \$20,000 a mile. These amendments have greatly facilitated consideration of and action upon the road projects submitted by the State highway commissions. There is now no special obstacle to the construction, in the different States of the Union, of the roads which serve the greatest economic needs.

TRoublesome Limitations Removed.

The act, as amended, places only three limitations on the type of road which may be built, as follows:

(1) That the roads shall be "substantial in character." This means that the road must be so constructed that it will carry the prospective traffic with such maintenance expenses that the total annual charges will represent a reasonable expenditure for the public service rendered by the highway. It is to the interest of the States that the roads on which Federal funds are used be substantially constructed, because the law requires them, or their civil subdivisions, as a prerequisite to receiving further funds, to maintain properly all roads built with Federal aid. There is nothing in the law which restricts types of construction between narrower limits than those established by sound finance and good engineering practice.

(2) That the amount contributed from the Federal Treasury in connection with any road shall not exceed 50 per cent of its cost or \$20,000 a mile. The main thing is to build a road that will stand the traffic in the particular section of the country where it is constructed. The conditions in certain regions may require a heavy, comparatively high-cost type of road, while in others a lower cost type may meet all the requirements. Sentiment is growing throughout the country, even in the newer sections, in favor of more substantial roads. The people are beginning to realize that the expense of maintaining the lighter traffic types under heavy traffic is unbearable.

(3) That the road must be a "rural post road" as defined in the act as amended; that is, "any public road a major portion of which is now used, or can be used, or forms a connecting link not to exceed 10 miles in length of any road or roads now or hereafter used for the transportation of the United States mails." Under the original wording of the law, Federal funds could be expended only on roads upon which the United States mails "now are or may here-

after be transported." This feature was the most troublesome to the highway departments of the various States. It required a definite determination in each case of the actual post-route status of the road, which necessarily involved delays in many instances. Under the new definition, very few important roads, if any, will be debarred from receiving Federal aid, if all the other requirements of the act are met.

Following the amendments to the act, the regulations governing its administration and the standards for plans, specifications, and estimates were modified, and one of the most successful former State highway engineers in the country was placed in charge of the Federal aid road work. He has at his disposal a large staff of local and district engineer aids, and no pains will be spared to provide any further Federal assistance that may be needed. An advisory committee, composed of representatives of the State highway departments, selected at the request of the department, by the American Association of State Highway Officials, with due regard to geographic considerations, also has been appointed to work in intimate touch with the Federal bureau, meeting with its officers at stated periods and at such other times as may seem desirable.

LARGE RESULTS FROM PRESENT FEDERAL LAW.

The record indicates that from July 1, 1918, to November 1, 1919, the department approved 1,345 road projects, involving the improvement of 12,159 miles, at an estimated cost of approximately \$181,143,644. Of this sum, approximately \$78,592,167 represents Federal funds. Since the passage of the Federal aid road act, 1,927 projects have been approved. These call for the construction of 18,596 miles of road at an estimated cost of \$225,267,847, of which about \$95,498,140 will be borne by the Federal Government. Gratifying progress also has been made in connection with the National Forest road work. From July 1, 1918, to November 1, 1919, 74 projects, involving 923 miles of road, were approved, and plans were completed for the improvement of 50 others, aggregating 946 miles.

The 1919 program for Federal aid road building is greater than any previous annual road-building accomplishment in this country. It is so great, in fact, that it undoubtedly will be necessary for many of the States to postpone until 1920 the expenditure of the Federal funds because of the necessity of developing experienced contracting and engineering organizations from the stagnant conditions brought about by the war. Under the terms of the act, the apportionment to a State for any one fiscal year remains available for expenditure until the close of the succeeding year. It is estimated that the funds already provided will be sufficient to finance next year a program more than four times greater than any that has ever been under-

taken. As indicated, \$294,000,000 has been made available from the Federal Treasury, and it is roughly estimated that the State funds to be expended cooperatively on road projects under the terms of the Federal act will aggregate \$385,000,000.

It is also true that some States will expend large sums in excess of those to be used on cooperative projects and that their several subdivisions will provide large additional amounts. It is interesting to note that up to July 1, 1919, State bond issues aggregating \$224,800,000 had been authorized and approved by popular vote and that provision has been made for voting next year on proposals for the issuance of additional State road bonds to the extent of approximately \$314,000,000. During the present and the next fiscal year, there will be made available for road improvements at least \$1,000,000,000. Certainly, few laws, if any, have produced greater results, either in terms of expenditures for a good purpose or in terms of helpful legislation and machinery, than the Federal aid road act. It seems clear, in the circumstances, that the principal limiting factors in the 1920 program will be those of rail transportation for, and production of, suitable road materials, the contractors' organizations available, and the labor supply.

NO ADDITIONAL ADMINISTRATIVE MACHINERY NEEDED.

The suggestion has been made that the Federal supervision of highways should be taken from the Department of Agriculture and placed under a Federal highway commission. A bill having this purpose in view has been introduced in the Senate of the United States. It provides for a Federal highway commission of three, each receiving a salary of \$10,000 a year, whose duty, among other things, would be to establish, improve, repair, and maintain a system of highways "to comprise not less than 2 per cent nor more than 5 per cent of the total highway mileage actually used as such in any State as ascertained by the commission hereinafter provided for, nor less than 2 per cent nor more than 4 per cent of the total highway mileage actually used as such in all of the States as ascertained by the commission, and affording convenient ingress to and egress from each State at not maintain buildings outside the District of Columbia, to operate less than three points and connecting with highways forming part of the national highway system in adjoining States." The commission is given the power to select or establish the highways to be comprised in the system, after having requested the State highway departments to recommend routes, and to determine the order in which all or parts of such highways shall be constructed, reconstructed, improved, repaired, and maintained. The Federal Government is to assume the maintenance of these roads. The commission

is furthermore empowered to take over the work of the Department of Agriculture relating to highway transportation, to construct and housing and subsistence facilities and commissary stores for the benefit of its employees and others engaged on work under its direction, and to purchase, lease, operate, and maintain such motor and other transportation facilities as it may deem necessary in the performance of its duties.

In considering any proposal of this sort, certain fundamental considerations must be borne in mind: (1) The roads in each section of the country are of varying degrees of importance in the service which they render or may render to the particular locality, to the State, and to the Nation as a whole; (2) this is a big country and the traffic conditions and needs vary greatly from section to section; (3) the State highway departments, being in immediate touch with local conditions, are best able to classify the roads properly on the basis of the economic purpose which they may serve; (4) the Federal Government, under the Federal aid road act, is cooperating in the improvement of the roads of greatest importance, the classification of which is fixed by the State highway departments; and (5) when this classification has been carefully made and by agreement between the highway departments of adjoining States, the roads of first importance generally meet at State boundaries, and, therefore, become interstate highways of nation-wide utility. The Federal Government, under the present law, is aiding the State highway departments in the classification of their roads on the basis of importance and needs, and Federal aid is rapidly being extended for their improvement, on projects submitted by the States and approved by this department.

The present machinery for supervising road construction is the Federal Bureau of Public Roads, one of the two most efficient agencies of the kind in the world, and the 48 State highway commissions. These, in effect, constitute an expert national commission, intimately in touch through its various parts with all sections of the Union, having no other purpose than that of serving the public interest. It is difficult to see what need there can be for additional or new machinery. Certainly, there is no necessity of creating a separate Federal highway commission or of substituting for the present cooperative program a plan which would commit or limit expenditure to a federally owned and maintained highway system. Such a plan would not meet present needs. There is as yet too much pioneer work required to trust the working out of proper highway policies to a small Federal commission.

Very properly the Federal aid road act places on the highway authorities of the several States responsibility, in large measure, for selecting the roads to be constructed. Obviously the local authorities are in a better position to judge what roads would serve

the largest economic needs than any group of men sitting in Washington would be. It is the duty of the Federal Bureau of Roads, with its district engineers, to see that the provisions of the law are complied with. It is giving, and will continue to give, all possible assistance to the State authorities in all their technical problems, as well as in the planning of State systems and in the classification of roads. It has been the policy of the department from the outset, in order to prevent haphazard action, to have the State highway authorities prepare and present tentative State systems of roads. It was apparent that rigid systems not subject to modifications as conditions might require would be inadvisable. Each State has worked out a system and, in general, it is being followed in the development of projects and the construction of roads. In a number of instances systems in general terms have been adopted by the legislatures. In formulating these systems, the engineers are giving due regard to interstate connections, that is, to roads connecting the system of one State with that of another, and as progress is made the construction of through roads will follow as a matter of course.

PROPOSED CHANGE WOULD MEAN LOSS.

I am convinced that nothing material would be gained by the proposed change. Much would be lost. Many complications would be introduced. The creation of a commission would entail unnecessary additional administrative expenditures and the commission could not do anything that can not be done more effectively by the existing cooperative machinery. I think it is not too much to say that there is a minimum of friction in the relations of the State and Federal authorities and that the majority of the State highway agencies are satisfied with the present arrangement and do not wish a change.

There would also be a radical change of policy. I am of the opinion that the people of the States will not be willing to substitute for the present policy of developing road systems on the principle of serving the broadest economic needs that policy advocated by those whose interest is in main or trunk line automobile roads primarily for touring purposes. The largest service will be rendered, not only to farmers but also to urban people, by following the principle of constructing roads of the greatest economic importance, selected after careful consideration by the State agencies having adequate knowledge and approved by the Federal department. It seems to me clear also that, as the work proceeds, we shall have roads which will be equally serviceable not only to those interested immediately in long-distance automobile travel and motor-truck transportation but also to those interested in getting their farm produce to the market in the easiest and most effective manner and in the transportation of the mails. I clearly

recognize the vast growth and importance of the motor-propelled vehicle passenger and freight traffic. It is estimated that we have 87 per cent of all such vehicles in the world, and we are only at the beginning of their use; but I am satisfied that the development of highways along present lines rather than along the lines proposed will result in their more extensive use. I have no prejudice against any sort of road except a bad road, or against any sort of construction except wasteful and unsubstantial construction. If traffic conditions require heavy construction, then I am in favor of it; and in any case, under the present law, the road must be substantial.

The road movement is growing very rapidly. The Federal aid road act has done much to promote it. Experience has brought about amendments to the law and helpful changes in administration. Comprehensive road programs have been inaugurated. They are being pushed vigorously. They will result, in a shorter time than most people imagine, not only in a network of good substantial roads in the various States of the Union, but also in the requisite interstate highways.

Why at this stage introduce complications and embarrassments? Why should not the friends of the movement for roads to serve the people cooperate? It is difficult for me to see why all who are animated by high public spirit in their thinking concerning highways should not cooperate in the development of present programs and in the perfecting of the existing processes and machinery, instead of attempting to overthrow them. I believe that many of those who are backing the proposed change do not know the facts and are not aware of existing conditions and possibilities.

CONTINUATION OF FEDERAL APPROPRIATIONS.

The period covered by the original Federal aid road act and its amendments will expire with the fiscal year 1921. The results to date clearly point to the desirability of continuing the policy of Federal participation in road building. If this is to be done, it is essential that a decision be reached at an early date, so that the States may be able to make the necessary financial provision and the State and Federal departments make the requisite administrative arrangements. If the financial condition of the Nation permits it, I believe it would be good policy to make available from the Federal Treasury, to be expended under the terms of existing legislation, \$100,000,000 for at least each of the four years beginning with the fiscal year 1922.

PAST ACTION AND FUTURE STEPS.

The promotion of agriculture and the betterment of rural life have, for many years, received the earnest attention and support of State and Federal authorities. Several generations ago the founda-

tions were laid for the two great agricultural agencies, the land-grant colleges and the Federal Department of Agriculture, which have no rivals elsewhere in the world. The State colleges steadily developed until in 1918 they had plants and endowments valued at \$184,400,000, annual incomes aggregating \$47,700,000, and resident and short-course students numbering 123,000, of whom 45,000 were in agricultural courses. Their student body has greatly increased this year. They are now engaged, in cooperation with the Department of Agriculture, in agricultural extension work involving an annual expenditure of more than \$14,000,000. They have been conducting investigational and educational work for many years and have placed in all parts of the Union farm leaders with scientific and practical vision. The Federal Department of Agriculture, whose personnel now numbers more than 21,000, is expending from all sources during the current year \$41,800,000, aside from the \$294,000,000 made available by the original and amended Federal aid road act for the cooperative construction of roads.

As has been repeatedly pointed out, the last five or six years have been especially fruitful of legislation and administrative action looking to the improvement of production and distribution. The principal items are the following:

(1) The Bureau of Markets, excelling in the character and extent of its activities any other similar existing organization.

(2) The Cooperative Agricultural Extension Act, the object of which is to disseminate information among the farmers, mainly through trained agents. As has been indicated, there is now expended annually, from Federal, State, and local sources, more than \$14,000,000 for work contemplated by this act.

(3) The Cotton Futures Act, with amendments, under the provisions of which standards for cotton have been established, the operations of the futures exchanges supervised, and the sale of cotton put on a firmer basis.

(4) The Grain Standards Act, which aims to bring about uniformity in the grading of grain, enable the farmer to obtain a fairer price for his product, and afford him a financial incentive to raise better grades of grain.

(5) The Warehouse Act, which authorizes the Department of Agriculture to license bonded warehouses and which makes possible the issuance of reliable and easily negotiable warehouse receipts, permits the better storing of farm products, increases the desirability of receipts as collateral for loans, and promotes the standardizing of storages and of marketing processes.

(6) The Federal Aid Road Act, as amended, which made available \$294,000,000 for cooperation between the Federal and State Governments in the construction of rural roads. It has conduced to the establishment of more effective highway machinery in each

State and strongly influenced the development of good road building along right lines. It will stimulate larger production and better marketing, promote a fuller and more attractive rural life, add greatly to the convenience and economic welfare of all the people, and strengthen the national foundations.

(7) The Federal Reserve Act, which authorized national banks to lend money on farm mortgages and recognized the peculiar needs of the farmer by giving his paper a period of maturity of six months.

(8) The Federal Farm Loan Act, which created a banking system reaching intimately into the rural districts and operating on terms suited to the farmer's needs. It is attracting more capital into agricultural operations, bringing about a reduction of interest to farmers, and placing upon the market mortgages which are safe investments for private funds.

(9) The Vocational Education Act, which, among other things, provides for cooperation with the States in training teachers of agriculture and in giving agricultural instruction to pupils in secondary schools.

Among other steps which should be taken are the following:

(1) The building up, primarily under State law, of a system of personal credit unions, especially for the benefit of farmers whose financial status and scale of operations make it difficult for them to secure accommodations through the ordinary channels.

(2) Expansion of existing facilities and activities for aiding farmers in marketing, including especially the extension of the market news and food-products inspection services and the assignment of trained market specialists to each State, in cooperation with the State authorities, to stimulate cooperative enterprises and to make helpful suggestions as to plans and methods.

(3) Continuation of the present policy of Federal participation in road building, through the appropriation, if the financial condition of the Nation permits it, of \$100,000,000 for at least each of the four years beginning with the fiscal year 1922, to be expended under the terms of existing legislation.

(4) The regulation and control of stockyards and packing houses.

(5) Federal legislation further to protect consumers against misbranded, adulterated, and worthless feeds entering into interstate commerce.

(6) Similar legislation dealing with fertilizers.

(7) Increased support by States for rural schools and more definite direction of their instruction along lines related to rural problems and conditions.

(8) The requisite legislation for the improvement of the sanitary conditions in rural districts and for the building up of the needed hospital and medical facilities.

NEED FOR BROAD SURVEY OF RURAL CONDITIONS.

Present conditions, and particularly present states of mind, indicate the need of a fresh, broad survey of rural life, of its special problems, and of its relationships. It should be viewed as a whole. A comprehensive flexible program should be developed for the guidance of the different agencies, each of which has its peculiar functions and responsibilities. Furthermore, the principles and purposes governing agricultural life and agencies should be set forth for the education of the American public, particularly the urban part of it. The Nation as a whole needs a fuller appreciation of its basic industry, and a more definite sense of direction of its efforts to foster it. Many agencies are now following more or less well defined, helpful plans of their own devising, but these are at best piecemeal, and there is confusion of leadership and objectives. A program made by any one element would be partial and unsatisfactory. We should have a meeting of minds of all those directly concerned, of farmers, of agricultural leaders, and of business men.

You have already indicated your intention to call a conference at which there will be not only a generous representation of farmers but also of agricultural agencies and organizations and of business interests which have an intimate relation to farm problems. I believe that, because of changed conditions here and elsewhere, of existing uncertainties, and of disturbed states of mind, this conference should be called at the earliest possible date. It may be that, as one outcome of it, the creation of a rural life commission, with a temporary or a permanent status, will be determined to be in the public interest. Certainly, the best means of fostering our basic industry can not too frequently receive definite consideration by the best minds of the Nation.

Respectfully,

D. F. HOUSTON,
Secretary of Agriculture.

The PRESIDENT.

REPORT OF THE CHIEF OF THE BUREAU OF ANIMAL
INDUSTRY.

JOHN R. MOHLER, *Chief of Bureau.*

ACTIVITIES RECEIVING SPECIAL ATTENTION.

INFORMATION ON FOREIGN LIVE-STOCK CONDITIONS.

To aid the live-stock industry in meeting changed international conditions following the armistice, the Bureau of Animal Industry has given close attention to a number of special problems. An

animal-production committee was formed to make a thorough study of meat animals and necessary plans whereby American farmers could supply the quantities of meat food products required. This work is being continued. To obtain accurate information on current live-stock conditions abroad, three representatives of the bureau visited Europe at different times during the year. Their observations in five countries were published through the news channels of the department.

The bureau has also issued statements through addresses and the press, outlining the position of the United States in relation to the world at large with respect to supplies of cattle, sheep, and swine. In addition, a circular, "The Trend of the Dairy Cattle Industry in the United States and Other Countries," was published. This shows by simple charts the advance or decline of cattle raising in the principal countries of the world from 1850 to 1918. This publication was followed by two others of similar character, one dealing with the butter and the other with the cheese industry.

LIVE-STOCK EXPORT REGULATIONS REVISED.

During the fiscal year the bureau, which issues export certificates for live stock, adapted its regulations to meet changed conditions. In their new form they facilitate materially the safe and humane handling of domestic animals, especially dairy cows and breeding cattle carried on ocean steamers.

By contributing to the arrival of the stock in the best possible condition, the revised regulations are a factor leading to a continuance of our export trade in live stock. During the year numerous shipments of both cattle and swine were made to South American points under export certificates issued by the bureau.

PROGRESS IN DISEASE CONTROL.

The long and anxious campaign which the bureau has been waging against animal diseases brought encouraging results during the last year. From a scientific point of view, victory over most of these maladies is in sight, and in a number of cases eradication is nearly complete. (See accompanying charts.)

Cattle scabies, which in 1906 was prevalent in nearly one-half of the United States, now appears only as outbreaks in limited areas. These outbreaks are being suppressed.

Eradication of sheep scabies, which in 1906 existed in more than one-half of the land area of the country, is now about nine-tenths complete.

The cattle tick which causes Texas fever has had its domain reduced from more than 700,000 square miles in 1906 to less than 300,000 square miles in 1918. Progress has been continuous year after year.

Hog cholera presents a somewhat different problem, as the nature of the disease makes the campaign of a sporadic character. But the use of antihog-cholera serum, especially in connection with virus, is a definite means of preventing serious outbreaks.

Recent investigations have shown that the common intestinal roundworm of the pig is not only injurious as an intestinal parasite but that during an early stage of its development, while still micro-

scopic in size, it invades the lungs and may give rise to serious troubles. Furthermore, pigs that survive this invasion of the lungs may never fully recover, but fail to grow properly, and become unprofitable runts. It is believed that much of the damage caused by the intestinal roundworm can be avoided by simple sanitary precautions, the practical application of which is now being tested. The problem of so-called "mixed infection" is also under investigation, with the view of determining more definitely its relation to hog cholera and the proper measures of control.

The United States has remained free from foot-and-mouth disease, and the bureau continues to exercise vigilance against its possible introduction. Serious outbreaks in foreign countries have been closely studied, and bureau inspectors have given special attention to cargoes of live-stock products from such countries, importations of the animals themselves not being permitted.

A questionnaire inquiry made among stockmen and State officials indicates an almost universal support of the method which the bureau employed successfully in stamping out past outbreaks of foot-and-mouth disease by slaughter of the animals affected.

Eradication of tuberculosis has progressed as fast as the work could be handled by the veterinary force employed; in fact, there has been a waiting list of herds to be tested. Under present authority from Congress only one-third of the appropriation for tuberculosis-eradication work can be used for operating expenses, the remaining two-thirds being allotted for the payment of indemnities. A reversal of the ratio, making available two-thirds for operating expenses, would increase greatly the progress of the work. Necessarily the diseased animals must be found before indemnity can be paid, and when only a few animals in a large herd react to the test the operating expenses exceed the Federal share of indemnity. Yet, finding those few reactors promptly before the disease spreads is essential to maintain the herd in a healthy condition.

The bureau now conducts tuberculosis-eradication work cooperatively with the officials of 43 States, and negotiations are in progress to extend the work to others. The District of Columbia is an excellent example showing that the disease is vulnerable to a definite campaign of eradication. In 1907 tuberculin testing in the District was undertaken, and more than 18 per cent of the cattle were found to be tuberculous. Tests made in 1919 on all cattle in the District showed a percentage of only 0.63 of 1 per cent affected. This is lower than in any previous year, and the disposal of the last reactors makes the District practically a tuberculosis-free area.

SECOND ACCREDITED LIST ISSUED.

During the year the bureau issued Herd List No. 2 of cattle officially accredited as free from tuberculosis and containing also a list of herds that successfully passed one test with a view to certification. Compared with list No. 1, dated July 1, 1918, the second list shows noteworthy progress as follows:

Accredited-herd list summary.

List.	Cattle accredited.	Cattle once tested without reactors.
List No. 1, July 1, 1918.....	6,945	22,212
List No. 2, April 1, 1919.....	19,021	97,243

From April 1 to the end of the fiscal year further progress was made, and the work is receiving hearty support from live-stock owners and officials.

CONSTRUCTIVE SIDE OF REGULATORY WORK.

Disease eradication is the basis of ample production and in final analysis of liberal consumption and proper nutrition. If the live-stock men of the country had to contend with pleuropneumonia, foot-and-mouth disease, surra, rinderpest, and other animal scourges on top of their present problems, production certainly would fall and consumption would be curtailed by reason of high prices necessary to cover the risks of production. Fortunately, this list of diseases may be considered a problem already solved. They do not exist in this country and the bureau is on the alert to keep them out.

The bureau has also taken energetic steps to check attempts at shipping diseased stock interstate, and perfected and strengthened its regulations especially with regard to bovine tuberculosis.

Coupled with those efforts, and to acquaint stockmen with the constructive side of the work, it has pointed out at frequent intervals the purpose of the regulations. As a result closer cooperation is developing between the public and the bureau's inspectors and veterinarians—a condition helpful to the effectiveness of field work.

MEAT INSPECTION RENDERS LARGE SERVICE.

The Meat Inspection Division set a new high mark in the extent of its service to the public. During the year more than 70,000,000 animals were slaughtered under Federal inspection, an increase of about one-fifth over last year, and also over the average of the last 12 years. Besides the bureau completed a survey of municipal and State meat inspection, and is prepared to aid cities in inaugurating or improving local supervision over their meat supplies.

IMPROVEMENT IN QUALITY OF LIVE STOCK.

From records collected it appears that the per capita meat consumption in the United States is increasing. This condition and the increase in population of the country point to the need for closely studying methods of production, especially with a view of making them as economical and attractive as possible. A similar problem exists regarding dairy and poultry products.

To establish and disseminate information on sound principles of production the year's work included numerous experiments in feeding, breeding, and care of stock. An extensive breeding experiment

with dairy cows has been undertaken cooperatively with two States. Results of many years of cow-testing work in all parts of the country were compiled, condensed, and prepared for publication. Poultry culling as a practical means of improving the average egg production has received special attention.

In all classes of live stock the value of purebred sires of good type has become so evident that a special campaign has been undertaken to place the facts before the public and enlist efforts to use purebred sires. In cooperation with the various agricultural colleges, live-stock associations and similar organizations, the bureau formulated plans for the work applicable to all parts of the country, and the campaign was inaugurated, effective October 1, 1919, under the slogan "Better Sires—Better Stock." Briefly, it provides (1) official recognition for live-stock breeders using purebred sires in all classes of stock; (2) a means of recording prominent breeds and varieties in States and counties; and (3) printed information on successful breeding methods suitable to average farm conditions. Every live-stock owner is eligible to enrollment in the campaign, the purpose of which is to banish scrub and inferior sires from the United States.

LITERATURE.

During the year 83 new publications were issued or contributed by the bureau. These include 15 Farmers' Bulletins, 10 Department Bulletins, 8 contributions to the Department Yearbook, 12 issues of Service and Regulatory Announcements, 8 articles for the Journal of Agricultural Research, 22 miscellaneous pamphlets, and 8 orders in the nature of regulations. In addition 247 articles relating to the work of the bureau were published in the Weekly News Letter.

REPORTS BY DIVISIONS.

The year's work as conducted by the various divisions of the bureau is presented more fully in the following pages:

ANIMAL HUSBANDRY DIVISION.

The war work of the Animal Husbandry Division, under George M. Rommel, chief, fell under two main heads—the emergency movement of drought-stricken live stock and the campaigns to stimulate production of hogs, poultry, beef cattle, and sheep. The conservation feature was quite as strongly emphasized as the importance of actual increase in production.

SAVING DROUGHT-STRICKEN CATTLE.

The shipment of cattle from drought-stricken areas was aided in the summer of 1918 as in the preceding year. The movement was principally from Texas to the Southeastern States, and nearly 300,000 head were shipped. The cattle were mostly cows, and a large proportion were bought outright in small lots and went into a section which promises to be our next great area for expansion in beef production. Where they were properly cared for they gave farmers a start of from 5 to 10 years over the usual methods of grading up native stock by purebred bulls. It cost the Government only a few cents a head to move these cattle. If these well-bred cattle had not

been moved as they were, they would have perished on the ranges or would have been slaughtered at the market centers.

In the summer of 1919 a similar movement of wide scope was undertaken to meet a similar situation in Montana and adjoining States. The work is in charge of a committee representing the Bureau of Animal Industry, the Bureau of Markets, and the States Relations Service, in cooperation with the agricultural colleges and the United States Railroad Administration.

STUDIES OF ANIMAL PRODUCTION.

The committee formed in the Animal Husbandry Division to study meat-animal production throughout the world as a war-time measure has continued its work. In the statistical part of its researches it had the hearty cooperation of the Bureau of Crop Estimates. The purpose was to prepare a program for animal production in 1919 which would meet the demands of the Allies and be practicable of application by our farmers. The essence of the committee's report was adopted in the department's recommendations published in the fall of 1918. The committee has devoted some study to the same subject for 1920, and it is the intention to continue this study of world meat production annually so far as resources permit.

BEEF-CATTLE INVESTIGATIONS.

BEEF PRODUCTION.

The beef-cattle experimental work was continued in Mississippi, North Carolina, and West Virginia, in cooperation with the State agricultural colleges, and on the Animal Husbandry farm at Beltsville, Md. In the steer-fattening experiments rations with only a small amount of concentrates were used. Nitrogenous supplements were used liberally, but the amount of grain was reduced to a minimum. Limited grain rations were used with satisfactory results, which indicates that beef can be produced economically largely on roughage when supplemented with a protein-rich feed.

BEEF-CATTLE EXTENSION.

Beef-cattle extension work was an important part of the movement to increase production. The extension specialists worked in all sections of the country, but much of the work was done in regions where the beef-cattle industry is practically new. The States included were Alabama, Arkansas, Florida, Georgia, Iowa, Mississippi, North Carolina, North Dakota, Oregon, South Carolina, Tennessee, Texas, New Mexico, and Virginia. The work was done in cooperation with the State agricultural colleges through their extension divisions, and particularly with the county agricultural agents.

The elimination of scrub bulls and replacing them with purebreds was advocated. The specialists placed a total of 1,408 purebred bulls, 1,981 purebred cows, and 11,291 grade cattle, in addition to approximately 150,000 head of cows and steers brought in from the drought area in the southwest. Many sales were conducted under the direct supervision of the beef-cattle specialists. The cattle for these sales were usually inspected and the undesirable ones eliminated. Fifty-

nine live-stock breeders' associations, with a reported membership of 1,524, were organized. Numerous calf clubs were organized among the boys and girls. The specialists held 464 meetings at which they addressed 23,633 people in the interest of better live stock. They also did some useful work in demonstrating the value of pasture and in giving advice on the growing of winter feeds and the planning of winter rations.

BEEF-PRODUCTION DEMONSTRATIONS.—Three hundred and seven demonstrations of various kinds were conducted to show the most approved methods and practices in beef production, including feeding, judging, dehorning, fitting animals for shows and sales, and other subjects. Thirty-nine herdsmen's courses were given. Each specialist conducted a number of steer-fattening demonstrations. One of these, on a Georgia farm, was of special interest because the cattle had been shipped from the drought-stricken area of Texas. Ninety-two head averaging 700 pounds were fed for a period of 101 days and made an average daily gain of 2.57 pounds. They cost \$10.50 per hundredweight and sold for \$12.50 per hundredweight. With this margin there was an average profit per steer of \$16.32. The feed cost per 100 pounds of gain was \$11.31.

SWINE INVESTIGATIONS.

Twenty-three purebred sows of six breeds and four purebred boars of four breeds were bought for the Beltsville farm. Sows saved for breeding purposes from those raised on the farm increased the number of brood sows in the herd to 38.

SWINE HUSBANDRY EXTENSION.

Fifty-six field men were employed in extension activities in swine production, which included pig-club work and the emergency pork-production campaign.

PIG CLUBS.—Cooperative work in connection with boys' and girls' pig clubs was conducted in 25 States, where there was an enrollment of 72,608 members, or an increase of 102 per cent over the year before. Complete reports were received from 11,593 members. The fact that the pig-club membership has doubled in the last year is only a slight indication of the zeal with which the boys and girls responded to the plea for increased meat production. A large percentage of the club members raised more than one pig, and there was a great increase in the number of sows and litters raised.

EMERGENCY PORK-PRODUCTION CAMPAIGN.—The Animal Husbandry Division undertook to aid in bringing about the production of sufficient pork and lard, with special attention to the needs of the Army and the Allies. It is only fair to say, however, that the Food Administration's influence on prices was one of the principal factors in maintaining and increasing production. Swine specialists of the Animal Husbandry Division cooperated with the State extension forces, county agents, and other agencies. In the Corn-Belt States the work was carried on as a separate enterprise, while in many of the Southern States it was associated with the pig-club work. Among the measures advocated were better feeding methods, the use of self-feeders, the growing of suitable forage crops, the improvement of quality of hogs, the production of fall as well as spring litters of pigs, the formation of breeders' associations, and the home

killing and curing of pork. Demonstrations in the use of the self-feeder and of forage crops were conducted in many counties, and the farmers were brought together at the demonstration farms to see the results. There was a big increase in the number of fall litters raised in 1918. In the efforts to promote the raising of better hogs, especially in the Southern States, the swine specialists assisted the farmers in purchasing breeding stock and in selecting the best animals from their herds for breeding purposes. The home killing and curing of pork was encouraged by demonstrations and by exhibits at fairs. The Negro farmers of the South received special attention in this respect, and great improvement in the quality of meat cured by them has resulted.

MOVEMENT OF FEEDER HOGS.

Because of a shortage of feed resulting from the drought in the Southwest, a great number of light hogs weighing from 60 to 125 pounds were shipped to market at a time when they should have been fattened. The bureau undertook to aid in having these hogs utilized as feeders, in cooperation with the Bureau of Markets, the live-stock markets, the various State extension forces, and local organizations.

Two methods were used. One was to have a representative visit the various stockyards and make arrangements to have the feeder hogs received, sorted, vaccinated, and disinfected. Then by publicity campaigns and correspondence, farmers desiring feeder hogs were informed when shipments of such animals could be expected and were invited to come and select their feeders. The other method was for the county agent to procure lists of farmers having feeder hogs for sale and send them to the State director of extension. Inquiries for feeder hogs were also sent to the extension office, and purchaser and seller were thus brought together. While definite statistics are not available, it is certain that more than 100,000 feeders were shipped into the Corn Belt as a result of this campaign.

FISHERY BY-PRODUCTS AS HOG FEED.

For several years the Animal Husbandry Division has been co-operating with the Bureau of Fisheries in studying the use of fish meal as a protein feed for swine. As a hog feed this material has been found to be equal to high-grade tankage, of which the supply is inadequate. During the year a new product known as shrimp bran was studied. The results of tests with this product as compared with fish meal, the remainder of the ration being shelled corn and middlings, were very favorable.

SHEEP AND GOAT INVESTIGATIONS.

FARM-SHEEP INVESTIGATIONS.

Experimental work with farm flocks of sheep is carried on at the bureau's farms at Beltsville, Md., and Middlebury, Vt.

At Beltsville a study is being made of specialized intensive sheep raising with complete reliance upon forage crops for summer pasturage. In 1916 a 30-acre area did not produce sufficient forage to feed satisfactorily 44 Southdown ewes and 33 lambs. This field is now capable of furnishing sufficient summer feed for 100 ewes with their lambs. The improvement is due in part to the application

of manures, lime, and phosphates, but chiefly to the fact that leguminous crops were largely used and all crops were fed upon the ground, the unused residues being plowed in. The results show clearly the possibility of a profitable sheep-raising business upon eastern lands under a system of seeding a rotation of forage crops and allowing such frequent changes of pasture as are necessary to prevent parasitic troubles.

EMERGENCY WORK IN SHEEP HUSBANDRY.—On account of the great importance of an increase in wool and lamb production during the war, the work on farm sheep demonstrations was supplemented by emergency extension work in Arkansas, Florida, Idaho, Illinois, Indiana, Kansas, Louisiana, Michigan, New Hampshire, North Carolina, South Dakota, Tennessee, Texas, and Vermont, under cooperative arrangements with the extension departments of the State agricultural colleges. The chief duty of the bureau's specialists was to aid the county agents in giving advice and direction to persons inexperienced in sheep raising and in endeavoring to bring about the largest possible returns of wool and meat from older flocks. A large number of new flocks were established. Demonstration meetings were held to explain how to select breeding ewes and rams, how to shear the sheep and prepare the wool for market, docking and castrating lambs, and proper management for procuring the maximum growth of lambs and for maintaining the health of the flock.

HORSE AND MULE INVESTIGATIONS.

BREEDING AMERICAN CARRIAGE HORSES.

The cooperative agreement with the Colorado experiment station at Fort Collins for experiments in breeding American carriage horses terminated June 30, 1919. July 1, 1919, the work was transferred to Buffalo, Wyo., where it will be conducted in cooperation with the State of Wyoming as a project for the development of a horse of general utility adapted to western range and farm conditions. Prior to terminating the work at Fort Collins the stud consisted of 7 aged stallions, 2 4-year-old stallions, 1 3-year-old stallion, 2 2-year-old stallions, 20 aged mares, 2 4-year-old mares, 7 3-year-old mares, 10 2-year-old fillies, and 13 1-year-old fillies, a total of 64 animals. Twelve stallions and 25 mares and fillies were selected for retention in the stud to be transferred to Wyoming. The remaining 27 animals were retained by the Colorado station.

The standard-bred stallion Harvest Aid 63908 was purchased by the department last spring and added to the stud. This stallion is a brown three-year-old, standing 15.2½ hands and weighs 1,180 pounds in his present form.

BREEDING MORGAN HORSES.

The breeding of Morgan horses at the Morgan horse farm, Middlebury, Vt., is progressing very satisfactorily, and uniformity is being attained in the animals produced. At the close of the fiscal year there were 9 mature stallions, 11 young stallions, 30 mares and fillies, and 7 geldings (including 3 draft-work geldings), a total of 57 animals. Sixteen animals were eliminated from the stud on account of being unsuitable for breeding purposes, and two died. Four of the mature stallions were sent out to various sections of Vermont for use in the Army horse-breeding work. The mare Grief, by

Snoqualmie and out of Gertrude, was added to the stud October 31, 1918.

The test in feeding weanling colts grain and hay ad libitum has given excellent results in maximum growth and development without harmful effects. The average daily feed consumed by the colts in this test was as follows: Oats, 8.52 pounds; bran, 3.39 pounds; alfalfa, 3.25 pounds; timothy, 4.91 pounds.

POULTRY INVESTIGATIONS.

POULTRY FEEDING.

Experiments in feeding hens for egg laying are in progress at the Beltsville farm in 27 feeding pens, 25 of which contain 30 hens each and 2 contain 50 hens each. The results of 1918 on the high vegetable protein rations were not entirely satisfactory. New experiments are being conducted this year in reducing the amount of the vegetable protein (soy-bean meal, peanut meal, and velvet-bean meal) and increasing the animal protein (meat scrap). The mash fed last year contained 10 per cent each of vegetable and animal protein, while this year the new pens receive 15 per cent meat scrap and 5 per cent of the high vegetable protein feed. Up to the close of the fiscal year the egg yield had continued good and had not been adversely affected by the summer weather, as was the case with the ration fed last year. The birds in the pen receiving peanut meal have slightly outlaid the others, being followed by those receiving soy-bean meal and velvet-bean meal in the order given. Apparently the ration being used this year is a considerable improvement over the one previously used. The pen receiving 10 per cent of cottonseed meal and meat scrap in the mash continues to give good results.

The experiment with feeding garbage is being continued through its second year with a fairly good egg yield but with excessive mortality, due apparently to the garbage. The pen on cooked vegetables with a rather light grain ration laid fairly well during the first year and is also laying particularly well the second year. Continued good results are being obtained on the ration which does not contain any wheat. Special tests on using one feed and its by-products supplemented with meat scrap, including such feeds as oats, barley, and corn, are being tried with fair results, but are not giving as good results as where two grains are used. Continued data on the feed cost of producing eggs from different breeds on different rations are being accumulated.

POULTRY BREEDING.

Practically all the hens on the farm, whether in feeding or breeding pens, are trap-nested, and all the chicks are pedigree hatched, so that their parents are known. In breeding for egg production the plan has been to continue matings of females of good production to males out of good producing females, at the same time selecting for quality in standard requirements.

In the experiments in grading up mongrel flocks by the continued use of purebred males the third generation of grades has been obtained and bred. The Barred Plymouth Rock grades show marked uniformity in color and type, and the White Plymouth Rock grades show improvement in this respect but do not yet all come pure white in color. In both kinds of grades individuals occur which so closely resemble purebreds that it is impossible to tell the difference by their appearance.

Further progress has been made in the difficult work of establishing a new breed with the combination of characters desired.

In carrying on the breeding work 70 different matings were made and about 3,000 chicks were hatched. The installation and operation of a mammoth incubator has helped greatly in the hatching.

PIGEON AND SQUAB INVESTIGATIONS.

The pigeon investigations have been continued along the lines previously followed, giving another year's data on the cost of raising squabs for market from the different varieties of pigeons commonly kept for that purpose. Investigations in the breeding and training of homing pigeons are being continued.

TURKEY AND GUINEA INVESTIGATIONS.

Information regarding the raising of turkeys and guinea fowl is being collected from time to time so that bureau publications on these subjects may be kept up to date.

POULTRY EXTENSION.

The emergency campaign to stimulate poultry production, carried on in cooperation with the State extension forces, begun in the fall of 1917, was continued throughout the past fiscal year. Since the signing of the armistice the efforts have been directed toward more efficient methods rather than to concentrate entirely on increased production. The work was carried on in 29 States by 41 field men. In 1919 there was reported from 21 of these States an average increase of 26.5 per cent in poultry production over the preceding year; 5 States reported a normal production, 1 slightly above normal, and only 2 showed a slight decrease, due principally to the high cost of feeds as compared with the price received for the finished products.

POULTRY CLUBS.

Nine poultry-club agents or specialists working in 8 States in the calendar year 1918 supervised the conduct of 2,151 boys' and girls' poultry clubs with an enrollment of 31,095 members, an increase of 107.3 per cent over the preceding year. These club members hatched 320,869 chicks and raised 233,123 mature fowls. They produced \$146,529.09 worth of poultry and eggs for market and breeding purposes, and the total value of their receipts and stock on hand at the end of the year amounted to \$403,690.46. One hundred and thirty-five poultry-club exhibits were held, at which 1,405 members exhibited 4,825 birds and 447 dozen eggs, and the total amount of special and cash prizes awarded to the members making these exhibits amounted to \$4,388. The average profit per member reporting was \$23.53.

ANIMAL GENETICS.

The inbreeding of guinea pigs has been carried to the twentieth generation wholly by mating brother with sister. Crossbreeding experiments, with the inbred families as material, have now been carried on for more than three years. The results of the past year are in agreement with those for the previous years. No very obvious degeneration has appeared in the inbred stock. There has, however,

been some decline in vigor. Fertility, including both size and frequency of litters, has suffered the most. Experiments on the resistance to tuberculosis of the different inbred families and of the crossbreds have been begun in cooperation with the Phipps Institute, of Philadelphia. A new statistical method has been developed in connection with investigations on the relative importance of the various factors which determine coat color, rate of growth, etc.

ANIMAL HUSBANDRY EXPERIMENT FARM.

Besides the experimental work carried on at the Animal Husbandry Division farm at Beltsville, Md., the general development of the farm has been continued. Progress has been made in drainage, completion of buildings, water system, soil improvement, improvement of grounds, and several minor projects. Drainage of all except woodlands has been completed; 16,649 feet of drain tile were laid during the year, making a total of 78,191 feet laid since the farm was acquired. All the large buildings and most of the portable houses have been newly painted.

CERTIFICATION OF ANIMALS IMPORTED FOR BREEDING PURPOSES.

Under the provisions of paragraph 397 of the tariff act of October 3, 1913, certificates of pure breeding were issued for 168 horses and 92 dogs.

DAIRY DIVISION.

On account of the high cost of feed and other materials used in dairying, the Dairy Division, under B. H. Rawl, chief, has given special attention to economical production through the use of improved dairy cows and proper feeding. To improve the dairy cows the use of better sires and the selection of cows has been encouraged by the promotion of bull associations and cow-testing associations, and this work has met with a hearty response from the producers. Bull associations, which make it possible for owners of small herds to have the use of good bulls and at the same time to utilize good bulls to the fullest advantage, have been especially successful. Extensive breeding projects have been begun at the Dairy Division experiment farm at Beltsville, Md., and also in cooperation with various States, for the purpose of determining the principles of breeding for establishing high-producing herds.

Much time has also been devoted to encouraging the fuller utilization of milk and milk products, and a special campaign was carried out to increase the consumption of milk where a surplus of this product was found. Improvement of dairy products has been undertaken by emphasizing the importance of sanitation on the farm and the necessity for the thorough cleaning of dairy utensils. Investigations in economy of production, such as fuel and steam utilization in factories, have been continued. Studies in the manufacture of foreign varieties of cheese have been extended and results of several years of experimentation with Swiss and Roquefort cheese have been put into practical use in the manufacture of these cheeses on a commercial scale.

Efforts were made to assist in war work with all facilities at the division's command. Surveys and inspections of milk supplies were

made in Army cantonments, and assistance was rendered the Navy Department through the inspection of butter. Work was done also on other war problems.

DAIRY EXTENSION.

Extension work in dairying serves to carry this industry into new sections, to introduce new practices developed as the result of research, and in general to unify methods throughout the United States. This work is generally carried on in connection with various State agricultural colleges. Cow-testing-association and bull-association work are the chief lines of activity.

SOUTHERN DAIRYING.

Efforts of the extension forces have been directed toward general dairy advancement in the South and the building up of a cheese industry in the mountain sections. Among the more important specific accomplishments have been the organization of 21 bull associations and 7 new cow-testing associations, reorganizing 5 cow-testing associations, assistance in the purchase of 1,849 head of cattle (among which were 169 purebred bulls and 771 purebred females), and the erection of 64 silos, 48 new barns, and many other smaller buildings. The great popularity of bull associations and the large number of dairy cattle brought into the Southern States give evidence of interest and progress in the improvement of dairy stock. Good results of the work for the development of the creamery industry are the growing popularity on the market of Mississippi butter and the fact that local creameries of central Tennessee are proving successful. The benefits of eradicating the cattle ticks are being realized more and more in the advancement of the dairy industry.

WESTERN DAIRYING.

During the first half of the fiscal year the extension work for the development of the dairy industry in the Far West was continued under unfavorable conditions, such as a shortage of labor, high prices of feed, and uncertain markets. Later, however, conditions were much improved. Dairy stock has been in great demand and there has been a widespread movement among producers to obtain purebred bulls. As a result of good cooperation among Federal, State, and county agents, cow-testing work has been given renewed life, bull-association work has been extended, and considerable interest has been taken in the utilization of creamery by-products. Silo construction has made greater progress than during any previous year. Agents of the Dairy Division assisted directly in the erection of 500 silos, which represent only a small part of the total number erected.

COW-TESTING ASSOCIATIONS.

Cow-testing associations, the formation and operation of which are encouraged and supervised by the Dairy Division, are made up of groups of dairymen who collectively hire a tester to keep records on production, butterfat test, and other data concerning each cow. During the first half of the fiscal year practically all testers were in military service and the work of the associations suffered severely.

Since the return of the soldiers to civil life there has been a revival of association work and a marked increase in the number of active associations. The total number of associations that were active July 1, 1919, was 385, representing 10,000 herds with 167,313 cows, compared with 353 associations active July 1, 1918, representing 9,778 herds with 168,348 cows. Oklahoma, South Carolina, and Texas reported active associations for the first time. Wisconsin continues to lead in the number of associations, with a total of 103, Pennsylvania ranking second with 38, Illinois third with 27, and Ohio fourth with 25. The associations continue to practice extensively the cooperative buying of feed. In Michigan an agent in dairying selected feeds for one association which resulted in a saving of \$3,000.

STUDY OF COW-TESTING RECORDS.

The tabulation of records of 38,532 dairy cows from 110 cow-testing associations is nearing completion. The tabulations have brought out a number of interesting relations between milk production, butterfat test, butterfat production, and income over cost of feed. The average milk production was 5,936 pounds per cow and the average butterfat production 246 pounds. For each 50 pounds increase in production of butterfat there was an average increase of \$15 in income over cost of feed. In the case of each breed an increase in the use of the butterfat test was accompanied by an increase in butterfat production and by a decrease in milk production. The larger cows excelled the medium and small cows in production of milk and butterfat. The results of this work are being prepared for publication.

COOPERATIVE BULL ASSOCIATIONS.

Bull associations have been found an inexpensive but very successful means of improving dairy cattle, and have therefore been very popular in sections where dairying is a new industry and the farmer's resources are limited. A greater number of really substantial cooperative bull associations have been formed this year than in any previous year since the movement started in this country, for out of a total of 82 associations now in operation 40 were organized during the past year. This work has been especially successful in the South. Requests for assistance from many States resulted in the selection of Georgia, Alabama, Mississippi, Louisiana, Texas, and Tennessee for association work. Associations were formed in each of these States except one. Work in the Western States was hampered by the lack of a director part of the year, but during the last six months of the year four substantial associations were organized, one each in Montana, Washington, Wyoming, and Oregon.

COMMUNITY DEVELOPMENT IN DAIRYING.

The project in community dairy development at Grove City, Pa., which was organized a few years ago as a means of demonstrating the value of intensive work in developing dairy communities, has now passed the experimental stage and has shown its value as a constructive influence in dairying. Many farmers, county agents, and bankers from all over the country have made inquiries or have visited Grove City with the idea of undertaking similar develop-

ment in their localities. In this enterprise the department has worked in cooperation with patrons of the creamery, and with the local breeders' associations, the commercial club, and the local banks. The past year witnessed the building of 21 silos and the improvement of farm buildings of 112 of the creamery patrons.

The accredited-herd plan for eradicating tuberculosis and maintaining herds free from that disease has been well received. In the Grove City area 327 herds are under supervision of the Bureau of Animal Industry and the Pennsylvania State live-stock sanitary board. Four new clubs having for their object the development, improvement, exhibition, and sale of tuberculosis-free cattle have been organized.

Other cattle clubs organized in previous years have generally shown increased membership. The cow-testing association has been reorganized with 39 members and 411 cows. Interest in purebred dairy cattle has continued to increase; 58 of the creamery patrons purchased 133 registered dairy females and 48 patrons purchased purebred bulls.

SUPPRESSION OF INFECTIOUS DISEASES IN DAIRY HERDS.

In connection with the work relative to cow-testing and bull associations, work of an educational nature has been done to further the prevention and eradication of tuberculosis and contagious abortion. Such work has been carried on in many States and has contributed to the marked popularity of the accredited-herd plan. In herds of these associations tested for tuberculosis by the Tuberculosis Eradication Division of the bureau, it was found in most cases that only a small per cent of the cows were diseased, but the elimination of the few disease spreaders before the herds could become badly infected was of great benefit and undoubtedly prevented later losses.

DAIRY DEMONSTRATION FARM, DENISON, TEX.

For several years a dairy farm near Denison, Tex., owned by a group of local businessmen, has been operated as a demonstration of the value of dairying under certain local conditions. This project was terminated during the year by the sale of the property by the owners, there having been a material increase in land values in that region as a result of oil development. During the last year of the project considerable terracing was done and many additions to equipment, improvements, and repairs were made from the earnings of the farm. The oat crop yielded well and the alfalfa crop was satisfactory, but the corn was only fair, because of dry weather.

STIMULATING PRODUCTION AND UTILIZATION OF DAIRY PRODUCTS.

In order to stimulate the production and consumption of milk and milk products for human food an educational campaign was carried on in numerous cities and small towns of the Northern States. This work was done principally among women. The objects were (1) to eliminate waste by a more comprehensive and varied utilization of dairy products, (2) to improve and enlarge the food supply, and (3) to encourage the dairy industry. The Dairy Division cooperated with the various States through the States Relations Service. The

campaign was divided into two major projects, one dealing with the larger cities in States where a milk surplus was reported, and the other with the smaller towns and rural districts.

In the city campaigns a wide variety of methods was used, depending largely on local conditions. In general, however, the process consisted in obtaining a large degree of cooperation from the city authorities, health boards, etc., together with talks and demonstrations in schools, factories, and department stores. In many cases attractive exhibits were placed in store windows and extensive use was made of publicity through press notices or paid advertising. Posters showing the food value of milk were also used effectively.

An example of such a campaign is the work done in Detroit, Mich., where it was found that there was a 30 per cent surplus of milk during the spring months. To utilize this surplus and at the same time to increase the consumption of milk and dairy products an extensive campaign was organized. Thirty-five thousand circular letters were sent out to leading citizens, and cooperation was received from 20,000 club members, the principals and teachers of the city schools, visiting housekeepers, welfare workers, clergy, physicians, hotels, restaurants, etc. A total of 371 lectures were given in schools, reaching 69,000 children directly and their parents indirectly, and the visiting nurses and visiting housekeepers carried the message to thousands of homes. Congregations of 65 churches listened to milk sermons, and thousands of factory employees and newspaper readers were also reached. Ten thousand posters were distributed and multitudes of people viewed window exhibits. As a result of the campaign a large per cent of the milk surplus was absorbed, milk sales increased, and sales of butter and cottage cheese increased materially. The board of health placed a high value on the campaign as a means of improving the health of the city. Similar campaigns were carried out in 16 cities of five States.

For the rural and small-town campaigns, agents in dairying were appointed for State-wide work in Iowa, Kansas, and Utah. In organizing the work in those States it was agreed that the colleges of agriculture were to train dairy workers. The extension departments, home demonstration agents, and in some States the county agents and club agents assisted with the work. The work in Iowa affords an example of how this type of campaign was conducted. In that State the value of milk was brought to the attention of school children by having them write essays on the subject, and 4,500 families were reached in this way. In the schools at Ames and Des Moines the value of milk as a food was demonstrated through tests in feeding fixed quantities of milk to a number of abnormal school children for periods ranging from 2 to 3 months. In all cases the results showed that milk caused additional gains in weight, and in many cases the children were reported by their teachers to be more alert mentally and easier to handle. In northeastern Iowa an educational campaign was conducted among rural schools and homes and resulted in an awakening among children and parents as to the value of milk as a food.

Efforts of the women dairy agents and of others who have helped in conducting farm-home dairy work in Southern States have been directed toward greater production of milk and more liberal use of milk and dairy products in the diet. Since a certain amount of milk

is usually made into butter on the farm, demonstrations and instruction in improved methods of buttermaking have been given to farm women. The increase in production and use of milk was accomplished through the "Buy a cow" campaign, instruction in the care and feeding of cows and the proper care of the milk, demonstrations in cooking, buttermaking, and cheesemaking, and exhibits of dairy products.

As a result of this work, 41,000 families are now using more milk for drinking and cooking, 448 family cows have been purchased, and 1,042,542 pounds of cottage cheese were made by farm women. An indication of the interest aroused in modern methods of dairying is shown by the purchase of 16,247 pieces of improved dairy equipment. Exhibits and contests have also done much to stimulate interest in more and better dairy products.

DAIRY-MANUFACTURING INVESTIGATIONS.

CREAMERY IMPROVEMENT.

Special attention has been given problems relating to organizing, building, equipping, and operating creameries. While many States were included in this work, special attention and help have been given to creameries in the Southern States, where the comparative newness of the industry made assistance in creamery development of vital importance. As a result of these efforts the manufacturing methods and the sanitation of the plants in many localities are now equal to those of the best dairy sections of the country. Much of this progress is due to improvement in methods of dairy farming and the resulting improvement in the quality of the cream brought to the creameries. In bringing about these results the field agents have worked largely with the farmers of small means who depend on dairying for a livelihood.

The high prices of coal and electric power have given new importance to economy and efficiency in power and refrigeration. A number of creameries were given assistance in building refrigerators, and specifications were furnished for exhaust-steam water heaters, resulting in material savings to the plants concerned. Exhaust-steam water heaters and hot-water boiler-feed pumps were installed by 45 creameries. Equipment for using exhaust steam for pasteurizing cream was installed by 6 creameries, balanced valves were put in 3 plants, and electric motors installed by 3 plants.

THE GROVE CITY CREAMERY.

The addition to the creamery plant at Grove City, Pa., has been completed, and cheese of the Camembert, Roquefort, and Swiss varieties is now being manufactured in an effort to encourage production in the United States of these cheeses, which heretofore have been largely imported.

Despite the high cost of feed and the curtailing of milk production, the Grove City creamery has surpassed the records made in 1918 in practically all lines, and the total business done has increased from \$375,595 in 1918 to \$520,486 in 1919. For the past few months the creamery has received larger premiums in price for its products than ever before.

CHEESE-FACTORY EXTENSION.

Much work has been done by the Dairy Division's field men in determining suitable localities for the manufacture of Cheddar cheese and demonstrating the proper methods of organizing, building, equipping, and operating cheese factories, training cheesemakers, and otherwise giving assistance in both the manufacture of cheese and the production of the milk for its manufacture. Several factories have been established as a result of this work, especially in the mountainous sections of the Southeast. The cheese produced has been generally of good quality and dealers have been eager to buy it at good prices.

INSPECTION OF BUTTER FOR THE NAVY.

The large quantities of butter contracted for by the Navy required extensive supervision by this department in the making of the butter and in investigating the results of various methods of manufacture and determining the effect of storage on the butter. Considerable time was spent in inducing creameries to make butter under Navy contract, also in obtaining inspectors and in making certain that the specifications were properly carried out. Although the packing of the butter was carried out under pressure of war conditions, the quality proved to be high. Seven supervisors and 90 inspectors were engaged in this work, which involved over 9,000,000 pounds of butter produced in 119 creameries. The butter was produced largely in Minnesota, Iowa, and California, with smaller quantities from Wisconsin, Michigan, and Pennsylvania.

When the Government commandeered butter held in storage in the principal markets of the United States, the butter allotted to the Navy was scored by department representatives at the request of the Navy Department.

INSPECTION OF RENOVATED-BUTTER FACTORIES.

The supervision of renovated-butter factories, consisting of an inspection of the sanitary condition of the factories and the approval of wrappers and cartons used, was conducted at 15 plants, whose output for the fiscal year amounted to 16,667,455 pounds. This is a decline of 14 per cent from the preceding year and of 62.75 per cent in 10 years.

MILK INVESTIGATIONS AND DEMONSTRATIONS.

SANITARY SURVEYS OF CITY MILK SUPPLIES.

Surveys on the sanitation of the milk supplies of several cities were made. These surveys were more detailed than in former years and took into consideration the source and handling of the milk supply, together with laboratory and inspection methods used in safeguarding its quality. Detailed bacteriological tests were made in many instances, and considerable help was given to the city authorities in the preparation of new milk ordinances. In the course of this work 478 dairy farms and 415 city milk plants were inspected, 3,532 bacterial counts were conducted, and 95 chemical tests were made.

SANITARY SURVEYS OF MILK SUPPLIES FOR ARMY AND NAVY.

Sanitary inspection work for safeguarding the milk supplies of Army cantonments and naval bases and hospitals was continued and extended at the request of the United States Public Health Service. Careful and thorough investigations of the source and handling of milk were made, and raw milk, sour milk, and repasteurized milk were excluded. This work was done in 9 cantonment zones, with specially complete surveys at Houston, Waco, and San Antonio, Tex., and Lawton, Okla.

MILK CONTESTS.

Each year the milk contest is proving itself more valuable as a means of improving the city milk supply and keeping the quality at a high standard. During the year five contests were held in five States and a total of 264 samples of milk and cream were given a complete score. Criticisms and suggestions for improvement were made to exhibitors.

MILK-PLANT MANAGEMENT.

The work in milk-plant management consisted largely of personal assistance in the operation of milk plants and help in the organizing of central plants. Assistance of various kinds was also given by correspondence, including the drawing of numerous special floor plans and making estimates of cost for proposed plants, collecting data relative to cost and method of operation, and giving special aid in the selection of equipment. The field work has been largely the gathering of data and assisting new plants in planning construction and equipment. At Atlanta, Ga., for example, the Dairy Division representative worked in cooperation with the health department in familiarizing the dealers with the new pasteurizing equipment required and helping the foremen to systematize the work, and in Minnesota, at the request of the State board of health, milk plants were studied and recommendations were made for the improvement of pasteurizing methods and equipment. Work of this nature was carried on in a large number of cities in 14 States.

MILK IMPROVEMENT AT GROVE CITY, PA.

Through experiments at the Grove City creamery an effort was made to work out some plans for improving the quality of the market milk and to procure better milk for cheesemaking. As a result the average of the bacterial counts in the milk during the summer of 1919 was even lower than the preceding winter's average. Probably the most important step taken in connection with sanitation was the adoption of the grading system of milk, by which milk sent in by the patrons is graded for bacteria, temperature, farm conditions, and sediment. The premiums paid on milk which received a high score have done much to improve the quality of the milk delivered by the patrons of the creamery.

METHOD OF CLEANING MILKING MACHINES.

The increase in the use of milking machines has made it desirable to devise some method of cleaning and sterilizing that will prevent excessive numbers of bacteria. After a study of the construction of various machines and methods of cleaning and sterilizing them under

farm conditions, a system of cleaning has been devised which has given good results in lowering bacterial counts and checking the spread of garget, but further work is required on the problem.

REQUIREMENTS FOR MILK PRODUCTION.

Studies of the various requirements for milk production have reached a stage where some definite information is now available. A two-year study on a group of dairy farms near Vergennes, Vt., has been completed and tabulations have been made on the requirements and cost of producing 100 pounds of milk and the requirements for keeping a cow for one year. Similar data have been obtained from two-year studies in Indiana and North Carolina. Experiments of a like nature have been in progress for one year on a group of dairy farms near Omaha, Nebr.; Amite, La.; and Mount Vernon, Wash., and more recently another has been begun at Middletown, Del.

DAIRY RESEARCH LABORATORIES.

BACTERIOLOGY.

The Dairy Division laboratories, in addition to research pertaining strictly to the dairy industry, have continued to carry on work of a broader character with a view to contributing to the knowledge and practical application in general. Some work of the latter nature too technical to be described in this report is in course of publication.

A study of streptococci from sour milk, feces, and the udder has resulted in the working out of methods for separating and distinguishing these organisms, and has shown the existence of a typical lactic streptococcus. Media which promise to be of considerable value in bacteriological technique have been developed by the substitution of yeast extract for the usual beef extract. Progress has also been made in developing a test for quality of milk through work with sporogenes.

MILK SECRETION.

Further studies on milk secretion have demonstrated that there is a close relation of the phosphorus and calcium content of the blood to the milk-producing function. It has been shown that a deficiency of phosphorus in the rations for cows and calves has a detrimental effect on milk secretion and growth. A remedy for this condition was found in the addition of sodium phosphate to rations deficient in phosphorus. Work with dairy cows has shown that the feeding of phosphorus and calcium results in a decided beneficial effect on the milk flow, in both amount and fat content. Balance experiments have shown also that the conditions under which it is necessary to keep cows while conducting work of this kind have a disturbing effect on the digestive processes. This observation calls for improvements in equipment used in the future.

CONDENSED AND EVAPORATED MILK.

Investigations have been undertaken with various forms of condensed and evaporated milk, with the general purpose of improving the physical condition and keeping qualities of these products.

Studies on the curdling of evaporated milk in sterilizing have been continued, and progress has been made on the problem of preventing the thickening of sweetened condensed milk on standing.

The theoretical sugar solution required to inhibit bacterial growth in the condensed milk has been determined within narrow limits. A study of the bacteria and yeast which might be involved in these changes has resulted in increased knowledge of their behavior.

Work with certain molds has positively demonstrated that the "buttons" of condensed milk are caused by this growth. Further results have shown that in commercial production the condensed milk may be produced without danger from molds if sealed under the vacuum produced by the ordinary vacuum pump.

Tests to determine the suitability of milk for condensing purposes indicated that neither the acid test alone nor the alcohol test alone nor a combination of the two was satisfactory.

ICE CREAM.

A substitute for a large part of the cane sugar in ice-cream making was found through experiment, and the formula was widely disseminated. The preparation of pure butterfat for ice cream and reconstituted milk has not given satisfactory results.

CHEESE.

A special effort has been made to apply the new methods of making the Swiss type of cheese on a commercial basis. In most of the factory trials this method was a success and resulted in the production of cheese of uniformly high quality. Before extensive work can be done with factories, however, a practicable means of distributing eye-forming cultures must be devised. The question of the relation of the culture and formation of eyes has been established beyond question.

In an attempt to introduce into this country the manufacture of various cheeses now imported, cheeses of the Camembert and Roquefort varieties were made successfully on a commercial scale at the Grove City creamery, but so far none have had a fair trial on the market.

UTILIZATION OF CREAMERY BY-PRODUCTS.

Considerable work has been done on the development of casein for use in waterproof glue, and a casein of low ash and acid has already been produced.

A method of producing casein from buttermilk is also being worked out. Using a solvent to extract the fat from the buttermilk, small lots of casein have been made, and this product was found to be of general good quality and low in fat and ash, but had the objection of dissolving slowly.

Work is now in progress with the object of developing a method of utilizing whey as a human food. It is probable that whey represents a greater actual loss of food than skim milk, because its feeding value is not generally recognized. Primost and Ricotta cheeses, which are made from whey, were produced at the Grove City creamery, but the demand has been limited. The use of these cheeses might be extended if their value for cooking could be brought to the attention of housekeepers. Investigations have also been begun on the utilization of whey solids in the form of poultry feed.

SILAGE INVESTIGATIONS.

Studies on the value and composition of corn plants and sunflower plants for silage have shown that good silage can be made from the latter as well as the former. Various tests have been made on the composition of these crops at different stages of maturity, but no correlation has been established between the composition of the plants and the quality of the silage.

WAR ACTIVITIES.

A considerable part of the time of the laboratory staff was spent in lending aid in preparing material necessary to carry on the war. Assistance was rendered to the Army Medical Corps by providing laboratory facilities for drying typhoid vaccine. Probably the most important work, however, was the developing on short notice of a method of making casein of more than ordinary purity. This was necessary in the manufacture of the waterproof glue essential to the manufacture of airplane parts. Another war problem worked out was the purification of oil-soaked cotton waste. This work was in progress and the process nearly perfected when the signing of the armistice made it advisable to discontinue the work.

DAIRY STATISTICS.

Considerable attention has been given to the gathering, compiling, and charting of statistical dairy information to meet the usual general demand as well as special requests from various war boards for such data. A circular on the trend of the dairy-cattle industry was published and material relating to the trend of the butter and cheese industries has been prepared for publication.

DAIRY ENGINEERING.

The Dairy Division has continued to deal with various engineering problems relating to dairying. Subjects given attention were the preparation of plans and specifications for buildings and machinery, the superintendence of construction, the inspection of materials and equipment and the designing and construction of apparatus, including work for the bureau and other institutions and for the dairy industry. Information has been furnished regarding dairy buildings and other problems in dairy engineering in reply to inquiries on these subjects, and 362 blueprints of various dairy buildings have been prepared for field men. Several new plans for dairy buildings were designed, including a creamery, a cheese factory, and a cow stable. A bulletin on the economical use of fuel was written and published.

DAIRY-CATTLE BREEDING.

A start has been made in the extensive dairy-cattle breeding experiments that were outlined in last year's report. The work deals with line breeding, inbreeding, and crossbreeding, the fundamental object being to determine the best method of developing the better-producing cows in large numbers. For work in line breeding as compared with the mating of unrelated animals a herd of 35 registered Holstein-Friesian cows has been established at the Beltsville farm,

and the producing ability of the cows is now being tested. Other breeding projects are to be carried out cooperatively with various experiment stations.

A study of the unusually prepotent breeding animals of the Holstein-Friesian breed is almost completed. In the study of 126 sires which have daughters with yearly records that conform to certain arbitrary standards, which were established for this work, it was found that all but 14 of them traced back to five sires.

MEAT INSPECTION DIVISION.

The Federal meat inspection, conducted by the Meat Inspection Division, with Dr. R. P. Steddom as chief, reached the largest proportions in its history. The number of animals slaughtered was 20.6 per cent greater than in the preceding fiscal year and 21.6 per cent greater than the average for the last 12 years during which the present meat-inspection law has been operative.

INSPECTION OF DOMESTIC MEATS.

Inspection was conducted at 895 establishments in 263 cities and towns, as compared with 884 establishments in 263 cities and towns during the fiscal year 1918.

Inspection was begun at 84 establishments and withdrawn from 73 during the year, as compared with 83 and 74, respectively, during 1918. Inspection was withdrawn from 66 establishments on account of discontinuance of slaughtering or of interstate business, from 2 for violations of the regulations, from 4 by request, and from 1 because of consolidation with another establishment under inspection.

ANTE-MORTEM AND POST-MORTEM INSPECTIONS.

The ante-mortem and post-mortem inspections are given in the following tables:

Ante-mortem inspection of animals.

Class of animals.	Passed.	Suspected. ¹	Condemned. ²	Total inspected.
Cattle.....	11,211,937	96,077	87	11,308,101
Calves.....	3,658,495	5,348	18	3,663,861
Sheep.....	11,277,597	6,240	14	11,283,851
Goats.....	125,640	27		125,667
Swine.....	41,322,940	106,977	2,469	44,432,386
Total.....	70,596,609	214,669	2,588	70,813,866

¹ This term is used to designate animals found or suspected of being unfit for food on ante-mortem inspection, most of which are afterwards slaughtered under special supervision, the final disposal being determined on post-mortem inspection.

² For additional condemnations see succeeding tables.

Post-mortem inspection of animals.

Class of animals.	Passed.	Condemned.	Total inspected.
Cattle.....	11,182,442	59,549	11,241,991
Calves.....	3,665,025	9,202	3,674,227
Sheep.....	11,253,999	14,371	11,268,370
Goats.....	125,342	318	125,660
Swine.....	44,269,584	128,805	44,398,389
Total.....	70,496,392	212,245	70,708,637

The next two tables show the diseases and conditions for which condemnations were made.

Diseases and conditions for which condemnations were made on ante-mortem inspection.

Cause of condemnation.	Cattle.	Calves.	Sheep.	Goats.	Swine.
Arthritis.....					2
Ascites.....					1
Blackleg.....	1				
Emaciation.....	2	2			9
Hemorrhagic septicemia.....	1		10		
Hog cholera.....					2,388
Injuries.....					6
Milk fever.....	1				
Pneumonia.....	9	1	1		48
Polyarthritis.....					5
Pregnancy and recent parturition.....	12		1		
Rabies.....	56	10			
Septicemia.....					5
Temperature.....	2	5	2		
Tetanus.....	1				
Texas fever.....	1				
Tuberculosis.....	1				
Tumors and abscesses.....					5
Total.....	87	18	14		2,469

Diseases and conditions for which condemnations were made on post-mortem inspection.

Cause of condemnation.	Cattle.		Calves.		Sheep.		Goats.		Swine.	
	Car-casses.	Parts.	Car-casses.	Parts.	Car-casses.	Parts.	Car-casses.	Parts.	Car-casses.	Parts.
Actinomycosis.....	350	109,795	30	1,658		52		6	2	24
Adenitis.....									1	
Arthritis.....		15		3		33				16
Asphyxia.....	1		10		5				1,329	
Atrophy.....	1									
Autointoxication.....					47				2	
Blackleg.....	20		8							
Bone diseases.....	11	5			1				59	2
Caseous lymphadenitis.....					1,481	19	24	9		
Cellulitis.....									4	236
Congestion.....	13		7		23				44	
Contamination.....	2	193	2	64					256	1,030
Cysticercus.....	251	397	16	3	111	7			312	14
Dropsical diseases.....	9		12	1	6				57	1
Emaciation.....	8,043		1,971		5,148		217		728	
Exhaustion.....									4	
Frozen.....									2	
Gangrene.....	87		12		12				22	
Hernia.....	4		1		17				77	
Hog cholera.....									24,131	
Hydronephrosis.....									3	
Icterus.....	71				1,488		10		2,825	
Inflammation.....			91							
Injury, bruises, etc.....		3,131		2						2
Injuries, bruises, etc.....	2,553	560	449	107	435	107	14	2	725	6,577
Leukemia.....	416		18		15				133	
Melanosis.....	35	5	29	5	19		4		78	1
Moribund.....	12		7		19				82	
Necrobacillosis.....	6		2	22	1	5			4	
Necrosis.....	8	515		3	1				4	1
Parasitic diseases.....	4				27		1		138	1
Phlebitis.....			145							
Pneumonia, peritonitis, metritis, enteritis, pleurisy, etc.....	6,348		1,503		4,789		32		19,094	
Pregnancy and recent parturition.....	28				60		3		31	
Septicemia, pyemia, and uremia.....	2,801		580		557		11		10,798	
Sexual odor.....									884	
Skin diseases.....	1		1						39	
Texas fever.....	263		620							
Tuberculosis.....	37,600	53,652	508	370	12		1		65,837	418,402
Tumors and abscesses.....	611	1,639	49	241	96	107	1		1,308	7,126
Total.....	59,547	166,791	9,202	2,479	14,371	330	318	17	128,805	433,433

The following table shows the total condemnations on ante-mortem and post-mortem inspections combined:

Summary of condemnations.

Class of animals.	Animals or carcasses.	Parts.
Cattle.....	59,636	166,791
Calves.....	9,220	2,479
Sheep.....	14,385	330
Goats.....	318	17
Swine.....	131,274	433,433
Total.....	214,833	603,050

In addition to the foregoing, the carcasses of 89,873 animals found dead or in a dying condition were tanked, as follows: Cattle, 5,237; calves, 4,784; sheep, 8,813; goats, 161; swine, 70,878.

INSPECTION OF MEAT AND PRODUCTS.

The inspection and supervision of meats and products prepared and processed are shown in the following table, which is a record only of supervisory work performed and not a statement of the aggregate quantity of products prepared. The same product is sometimes duplicated by being reported in different stages of preparation under more than one heading.

Meat and meat food products prepared and processed under inspection.

Kind of product.	Pounds.	Kind of product.	Pounds.
Placed in cure:		Meat extract.....	3,460,874
Beef.....	327,360,122	Lard.....	1,256,042,851
Pork.....	3,717,838,052	Lard oil.....	618,123
All other.....	2,588,734	Lard stearin.....	514,218
Sausage, chopped.....	667,602,113	Compound and other substitutes.....	469,731,660
Canned product:		Pork to be eaten uncooked.....	42,165,696
Beef.....	483,972,721	Oleo stock and edible tallow.....	58,768,630
Pork.....	143,345,433	Oleo oil.....	138,700,323
All other.....	4,940,949	Oleostearin.....	69,339,566
Sterilized product:		Oleomargarin.....	251,169,778
Beef.....	4,045,975	Miscellaneous products.....	1,516,694,904
Pork.....	10,132,470		
All other.....	8,857	Total.....	9,169,042,049

The following quantities of meat and meat food products were condemned on reinspection on account of having become sour, tainted, putrid, unclean, rancid, or otherwise unwholesome: Beef, 15,898,479 pounds; pork 14,113,246 pounds; mutton, 152,981 pounds; veal, 116,016 pounds; goat meat, 42,598 pounds; total, 30,323,220 pounds.

MARKET INSPECTION.

Market inspection was begun during the fiscal year at two cities, making a total of 45 cities at which this inspection is maintained in order that interstate deliveries of meats and products may be made therefrom.

MEAT AND PRODUCTS CERTIFIED FOR EXPORT.

The following products were certified for export: Beef and beef products, 714,706,213 pounds; mutton and mutton products, 3,297,395

pounds; pork and pork products, 2,774,067,187 pounds, a total of 3,492,070,795 pounds. In addition 536 certificates were issued covering the export of 15,071,507 pounds of inedible animal products.

EXEMPTION FROM INSPECTION.

The provisions of the meat-inspection law requiring inspection usually do not apply to animals slaughtered by a farmer on a farm nor to retail butchers and dealers supplying their customers. The retail butchers and dealers, however, in order to ship meat and meat food products in interstate or foreign commerce, are required first to obtain certificates of exemption. The number of exemption certificates outstanding at the close of the fiscal year was 2,551, an increase of 43 over the preceding year. During the year 103 certificates were canceled, 99 on account of the dealers retiring from business or ceasing to make shipments, and 4 for violations of the regulations. During the year 31,470 shipments were made by retail dealers and butchers holding certificates of exemption, as compared with 45,524 shipments during the fiscal year 1918. The shipments of the year covered products as shown in the following table:

Shipments by retail dealers and butchers under certificates of exemption from inspection.

Product.	Number.	Pounds.	Product.	Number.	Pounds.
Beef, carcasses (729 quarters)	182	75,232	Cured meats.....		190,525
Veal, carcasses.....	22,354	2,005,827	Lard.....		10,655
Sheep, carcasses.....	176	9,185	Sausage.....		50,603
Swine, carcasses.....	399	53,654	Miscellaneous (scrapple, tripe, headcheese, etc.).....		22,283
Beef, fresh.....		538,288			
Veal, fresh.....		155,219	Total.....	23,111	3,346,214
Mutton, fresh.....		110,176			
Pork, fresh.....		124,567			

During the year 60,197 interstate shipments were made of meats and meat food products from animals slaughtered by farmers on the farm, as compared with 73,746 shipments made during the fiscal year 1918. The following table shows the products covered by these shipments:

Shipments of farm-slaughtered products under exemption from inspection.

Product.	Number.	Pounds.	Product.	Number.	Pounds.
Beef, carcasses (2,662 quarters).....	665	259,985	Pork, fresh.....		161,910
Calves, carcasses.....	82,881	7,382,960	Cured meats.....		648,713
Sheep, carcasses.....	2,809	89,157	Lard.....		151,248
Swine, carcasses.....	8,716	1,140,824	Sausage.....		118,049
Beef, fresh.....		39,052	Miscellaneous (scrapple, tripe, headcheese, etc.).....		20,500
Veal, fresh.....		49,014			
Mutton, fresh.....		4,643	Total.....	95,071	10,066,055

INSPECTION OF IMPORTED MEATS.

The following table shows the inspection of imported meats and meat food products for the fiscal year, representing an increase of 204.8 per cent over the inspections for the preceding year.

Imported meat and meat food products inspected.

Country of origin.	Fresh and refrigerated meats.		Cured and canned meats.	Other products.	Total weight.
	Beef.	Other classes.			
Argentina.....	451,456	38,781	79,278,623	114,029	79,882,889
Australia.....		33,415	40,185	1,015,940	1,089,540
Brazil.....			6,131,237		6,131,237
Canada.....	24,422,629	8,803,590	8,519,615	3,502,883	45,548,717
Uruguay.....	483,170		28,508,129		28,991,299
Other countries.....	6,018,521	1,928,777	7,138,323	3,181,839	18,267,460
Total.....	31,375,776	10,804,563	129,916,112	7,814,691	179,911,142

The following statement shows the condemnations of imported meats and the amounts refused entry on account of lack of foreign certificates or other failure to comply with the regulations.

Import meat products condemned or refused entry.

Product.	Con-demned.	Refused entry.
Beef.....	329,270	466,400
Veal.....	200	
Mutton.....	36	
Pork.....	10,852	35,396
Total.....	340,358	501,802

INSPECTION FOR OTHER DEPARTMENTS OF THE GOVERNMENT.

By request of the Navy, War, and Interior Departments reinspections of meats and meat food products to determine whether they were wholesome and conformed to the specifications were made during the fiscal year. Inspections were made at 50 places for the Navy Department and 68 for the War Department. The following table shows the amounts of such inspections.

Inspection for other branches of the Government.

Department.	Inspected.	Rejected.
	<i>Pounds.</i>	<i>Pounds.</i>
Navy Department.....	173,463,509	5,200,846
War Department.....	114,273,114	4,791,392
Interior Department (Indian Affairs).....	497,228	4,300
Marine Corps.....	9,931	
Panama Railroad.....	4,784	
Total.....	288,248,566	9,996,538

LABELING OF MEAT AND PRODUCTS.

The law provides for the approval of labels and other markings previous to their use on meat and meat food products, and prohibits the application of false or deceptive names. The regulations made under these provisions of law require that sketches of new trade labels and other markings be submitted for official approval, to be

followed by the submission of the finished labels and markings for final approval. There were submitted during the year enormous quantities of materials, including labels, cartons, stencils, box dies, brands, and tags, as well as inserts placed inside of meat containers, and advertising matter bearing copies or reproductions of the Federal meat-inspection legend. Large numbers of these were found to contain false and misleading statements concerning the character or composition of the product represented and were disapproved.

NET WEIGHT AND VOLUME LAW.

The net weight and volume amendment to the food and drugs act, being applicable to meat and meat food products, is administered by the Meat Inspection Division in establishments under the Federal meat inspection. Numerous questions arose concerning the proper method of computing the weight of canned products and tolerances and variations from the declared quantity of contents which might be considered reasonable within the meaning of the statute. The question of liquids surrounding the meat and products in cans was also given attention, resulting in the correction of the practice of including the weight of added water in the statement of quantity on containers. In the case of canned products packed for commercial use and found to bear incorrect statements of weight relabeling was required. Errors of this nature occurring on products prepared for the Army were called to the attention of the War Department and resulted either in the correction of the statements of weight or in the rejection of the products.

In cooperation with the War Industries Board and the Committee on the Conservation of Tin Plate of the Federal Food Administration the slack filling of tin containers of meat or meat food products at establishments under inspection was prohibited during the period of the war.

MEAT-INSPECTION LABORATORIES.

The laboratory examination of samples of meat and meat food products prepared at establishments at which inspection is conducted has been continued in the meat-inspection laboratories maintained in Washington and six other cities of the country. This examination consists in determining whether the product is properly labeled or contains any deleterious substance, in analyzing spices, waters, and other ingredients used in the curing and preparation of meat food products, and in analyzing rat exterminators, inks, etc.

The laboratories also continued to examine meat and products prepared for the Army and the Navy to determine whether they contained any harmful substance and to see that they conformed to the Army and Navy specifications.

The total number of products analyzed during the year was 60,040, of which 51,737 were domestic, 992 imported, and 7,311 specially prepared for military consumption. Samples of 1,491 domestic and 38 imported products were found to be not in accordance with the regulations and 21 of those examined for the Army and the Navy were rejected. Of 686 waters examined 111 were prohibited for use in their untreated state where they would come in direct contact with meats.

Four hundred and fifty gallons of branding ink was prepared and sent to meat-inspection stations for use in marking meats.

In addition to the routine work of a regulatory nature, the Washington meat-inspection laboratory has cooperated with the Office of Home Economics of the States Relations Service in studying the composition of undigested fats. Studies have been made also of fats which had been heated to the smoking temperature, the tests showing that such fats undergo a slight decomposition. The Washington laboratory developed a method for the detection of whale meat in sausage or other mixtures with animal fats. In cooperation with the Bureau of Markets, the Washington and St. Louis laboratories have made studies of the melting point and composition of the fat of soft pork. All creameries which prepare butter to be used in oleomargarin were inspected, and lists were issued showing those which met the requirements relative to pasteurization.

QUARANTINE DIVISION.

The work of the Quarantine Division, under Dr. R. W. Hickman, chief, has consisted, as heretofore, in the inspection and quarantine of imported live stock, the inspection of animals for export, the tuberculin testing of import and export dairy and breeding cattle, the inspection, disinfection, and fitting of ocean steamers which carry live stock, and the administration of regulations governing the importation of hides, hair, wool, hay, straw, etc.

INSPECTION AND QUARANTINE OF IMPORTED ANIMALS.

Imports of live stock were seriously interfered with by the great difficulty in procuring steamer space and sailings during the first half of the fiscal year and also by the appearance of foot-and-mouth disease in England. Outbreaks of that disease in Sussex in September and in Yorkshire in January necessitated the closing of United States ports to European shipments until late in April. With the improvement of shipping conditions and the reopening of our ports to British shipments, American purchasers in England promptly made use of the opportunity for which they had been waiting, and live-stock importations for May and June indicated a return to the normal volume.

The following tables show the importations of the various kinds of live stock through the different ports of entry:

Imported animals inspected and quarantined.

Port of entry.	Cattle.	Sheep.	Swine.	Other animals.
New York.....	585	295	9	156
Boston.....	110			
San Francisco.....		128		94
Canadian border ports.....	1,878	618	152	44
Total.....	2,573	1,041	161	294

Imported animals inspected but not quarantined.

Port of entry.	Cattle.	Sheep.	Swine.	Goats.	Horses.	Other animals.
New York.....					74	
Baltimore.....					110	
Boston.....	110				1	
New Orleans.....					22	
Philadelphia.....						1
San Francisco.....						471
Key West.....				2	331	
San Juan.....	357					
Newport News.....					6	8
Mexican border ports.....	88,778	63,973	273	24,725	5,509	1
Canadian border ports.....	356,549	117,973	24,102	14	8,753	99
Total.....	445,794	181,946	24,375	24,741	14,866	580

Inspectors of the bureau also inspected and held in quarantine for the Bureau of Biological Survey 4,358 live quail imported from Mexico for breeding purposes.

The 357 cattle shown in the second table as entered at San Juan, Porto Rico, were shipped from the Virgin Islands and were not subject to the United States quarantine laws.

The animal quarantine station for the port of Baltimore, having been turned over to the War Department early in the preceding year for the storage of munitions and not yet relinquished, was unavailable for quarantine purposes throughout the entire year; hence all importations of animals subject to quarantine and coming to the Atlantic seaboard were entered at New York or Boston.

Through the courtesy of the British Government the bureau has continued to maintain an inspector in Great Britain, among whose duties is the tuberculin testing of cattle intended for shipment to the United States. During the year 786 cattle were so tested in the United Kingdom and the Channel Islands at the request of importers. This work is shown in the following table:

Results of tuberculin tests of cattle for importation into the United States.

Breed.	Tested.	Passed.	Rejected.
Ayrshire.....	2	2	
Guernsey.....	567	562	5
Hereford.....	2	1	1
Holstein.....	1	1	
Jersey.....	123	120	3
Shorthorn.....	91	84	7
Total.....	786	770	16

Cattle not accompanied by satisfactory certificates of tuberculin test signed or approved by the bureau inspector in Great Britain must be tested in quarantine after arrival in the United States. Ninety-nine cattle were thus tested and all were passed.

IMPORTATIONS OF ANIMAL BY-PRODUCTS.

The bureau, through the Quarantine Division, has continued its cooperation with the Treasury Department in the administration of the regulations governing the sanitary handling and control of hides,

skins, and other animal by-products offered for entry into the United States. This bureau endeavors to protect the domestic live stock from possible infection of anthrax, foot-and-mouth disease, and rinderpest, which diseases exist in many parts of the world from which animal by-products are imported. These regulations provide that hides and skins from countries where anthrax is prevalent, or in which foot-and-mouth disease or rinderpest exists, shall be disinfected prior to shipment, or, at the discretion of the shipper, any such hides and skins may be forwarded to the United States, subject to disinfection at a tannery at destination under bureau supervision. The greater part of the imported hides and skins are so certified as to render them eligible for importation without disinfection.

INSPECTION OF ANIMALS FOR EXPORT.

The exportation of live stock is subject to regulations providing for inspection to assure that the animals are in good health and for their humane handling and safe transport. All live stock offered for export is inspected and in certain cases certificates are issued. Cattle for dairy and breeding purposes are subjected to the tuberculin test. Statistics of the inspection of animals for export are given in the following table:

Inspection of animals for export.

Kind of animals.	With certificate.		Without certificate.		Total.
	American animals.	Canadian animals. ¹	To Canada.	To other countries.	
Cattle.....	1,361	1	8,735	818	10,915
Sheep.....	8		5,155		5,163
Goats.....	9		18		27
Swine.....	696		98	602	1,396
Horses.....	² 9,775		5,441	234	15,450
Mules.....	³ 8,150		193	3	8,346
Total.....	19,999	1	19,640	1,657	41,297

¹ In former years considerable numbers of Canadian animals were exported through the United States. Although only one animal was so exported during the past fiscal year, this column is kept separate for comparison with previous statistics.

² Including 9,615 horses to Europe for military purposes.

³ Including 7,411 mules to Europe for military purposes.

Of the cattle inspected for shipment to Canada, 1,321 were dairy and breeding stock and were tested with tuberculin; 85 reacted and were rejected. The remaining 7,414 cattle for Canada were range animals and were not tested. The 818 cattle for other countries were tested with tuberculin; 10 reacted and were rejected. The mallein test was applied to the 5,441 horses and 193 mules for Canada and 234 horses and 3 mules for other countries, with only 2 reactors.

In carrying out the regulations governing the overseas transportation of live stock 215 inspections of vessels were made before clearance.

DAIRY AND BREEDING CATTE FOR BELGIUM AND FRANCE.

Since the close of the war an entirely new line of business is in course of development in connection with the exportation of live stock, namely, the shipment of dairy and breeding cattle to France

and Belgium. Three small shipments had gone forward at the close of the year, one to France and two to Belgium, the former consisting of 135 head and the latter of 180 and 350, respectively.

FIELD INSPECTION DIVISION.

The Field Inspection Division, under Dr. A. W. Miller, chief, has continued its activities for the control and eradication of certain diseases of live stock and has also conducted work in the enforcement of certain live-stock quarantine and transportation laws.

ERADICATION OF SCABIES.

In the work of eradicating sheep scabies in cooperation with State officials bureau employees in the field made 22,394,561 inspections and supervised 10,518,196 dippings, constituting increases over the year before of 14 and 88.3 per cent, respectively. The bureau also assisted State authorities in arresting outbreaks of sheep scabies in Michigan and Iowa. In Michigan the eradication has been practically completed, while in Iowa, where the infection was widely scattered through the introduction of feeder sheep, progress is being made toward its elimination. No cases of the disease are now known to exist in Montana or North Dakota, and in Idaho the considerable spread of the infection following the outbreak of the previous year has been brought under control and the work of eradication in affected areas is progressing. The island of San Clemente, Calif., was quarantined on account of the prevalence of sheep scabies.

In the course of the cooperative eradication of cattle scabies bureau employees made 1,707,917 inspections and supervised 935,539 dippings of cattle in the field, the dippings marking an increase of 46 per cent over the figures for the preceding year. An extensive spread of the infection in western Kansas is being brought under control, and in the new areas of infection in southwestern New Mexico effective work is being done by bureau and State employees. In northwestern Texas and in Montana the disease was found to exist to a considerably greater extent than for several years.

Bureau employees also assisted State authorities in Colorado, Nebraska, and Vermont in efforts to eradicate sarcoptic mange in numerous herds of cattle in those States.

Horses and mules to the number of 414 were inspected for scabies and 74 were dipped under bureau supervision.

ERADICATION OF DOURINE.

Intensive efforts to control and eradicate dourine of horses were continued and satisfactory progress was made. In the Middle and Northwestern States, where the disease has prevailed, the extent of the infection was found to be considerably less than in former years. No cases are known to exist in Iowa or Nebraska, and the infection exists only to a slight extent in North Dakota and Wyoming. In South Dakota a large number of animals were tested and less than 1 per cent found to be affected. In Arizona and New Mexico, however, especially in the former, further investigations and the testing of large numbers of horses revealed the widespread existence of the disease. As the affected areas are largely within the various Indian reservations, and the horses, which are owned principally by the Indians

living under a tribal form of government, are wild ponies ranging in rough and inaccessible regions, eradication work is carried on under great difficulties. However, officials of the States concerned and of the Indian Service of the Department of the Interior, as well as horsemen in the affected areas, have cooperated with the bureau in a satisfactory manner and considerable progress has been made. The bureau continued the practice of paying one-half of the appraised valuation of infected horses destroyed when they were owned by citizens, such share not to exceed \$100 in any one case. The number of animals tested and the results of the tests are reported by the Pathological Division.

INSPECTION OF ANIMALS FOR INDIAN AGENCIES.

In cooperation with the Office of Indian Affairs, 53 head of horses and mules and 40 head of cattle were inspected for allotment to Indian agencies. Twenty of the horses and mules were rejected, the remainder of the animals being passed for allotment.

CONTROL OF INFLUENZA, ANTHRAX, AND OTHER DISEASES.

In continuation of the war emergency campaign to stimulate the production and conservation of live stock, work was carried on looking to the control of anthrax, influenza, and other diseases and to a reduction of the losses resulting therefrom.

The assignment of 30 bureau employees to service with the War Department to assist in the efforts being made to reduce losses among Army horses and mules from influenza was continued until about February 1. The activities of these employees were directed toward bettering sanitary conditions at all points where public animals were handled, and great improvement was made, with the result that such losses were very materially reduced.

At the large markets of the country bureau employees were regularly assigned to work for the control of influenza, inspecting all horses and mules received and isolating sick animals. At those stations 507,559 such animals were inspected, of which 5,341 were sent to the hospital. Of the latter number 622 died of influenza, which showed a great reduction below the average losses of previous years. In addition to the regular assignments, cooperation was extended to State officials and horsemen at practically all bureau stations.

Cooperation was extended to the officials of various States, especially those along the Gulf coast, in the control of anthrax and the reduction of losses from that disease. Bureau employees supervised the disinfection of infected premises and the proper disposal of carcasses of animals dead from anthrax, and whenever necessary assisted the owners of infected herds in the vaccination of susceptible animals. In southern Texas alone, where the disease has existed extensively in recent years, bureau employees assisted in the vaccination of about 30,000 animals. Good results were obtained and the value of prompt and vigorous control measures was fully demonstrated.

On the request of stockmen or other interested persons, bureau employees were detailed to investigate outbreaks of blackleg, to advise owners as to the proper treatment, and, if necessary, to assist in vaccination.

Investigations of reported outbreaks of disease among domestic animals were made in various parts of the country. In cooperation with the State officials of South Dakota the bureau assisted in successfully arresting a serious outbreak of cerebrospinal meningitis among horses. Cooperation was also extended to the National Park service in determining the cause of the death of a number of buffaloes in Yellowstone Park.

To guard against the recurrence of foot-and-mouth disease, careful inspections of all ruminants and swine received at public stockyards were made by experienced veterinarians specially assigned to that work as in previous years. Prompt investigations were made of all suspected outbreaks of the disease reported to the bureau, with negative results in all instances.

LIVE-STOCK SANITARY WORK IN INTERSTATE COMMERCE.

In the course of supervising the interstate transportation of live stock to prevent the spread of animal diseases, bureau employees at market centers inspected 22,594,329 cattle, of which 10,897 were dipped under bureau supervision in order that they might continue in interstate commerce. Sheep to the number of 20,597,232 were also inspected for communicable diseases, and of these 884,294 were dipped under bureau supervision to comply with the regulations of the department or of the States of destination.

An outstanding feature of this work during the year was the great increase in the number of swine immunized against hog cholera in order that they might be distributed from public stockyards for purposes other than slaughter. The number so immunized after careful inspection was 614,673, an increase of 140 per cent over the preceding year.

Upon request of transportation companies and shippers or to comply with laws of States to which shipments were destined, bureau veterinarians inspected 17,346 horses and mules, of which 5,854 were tested with mallein, 9 showing reactions.

During the year 24,655 cars carrying animals affected with communicable diseases were received at bureau stations. In compliance with department regulations or on request of Canadian Government officials, State officials, or transportation companies, 44,843 cars were cleaned and disinfected under bureau supervision.

VIOLATIONS OF LIVE-STOCK TRANSPORTATION AND QUARANTINE LAWS.

The bureau has continued to report to the Solicitor of the department, for presentation to the proper officials of other departments, cases of apparent violations of live-stock transportation and quarantine laws. Many of these cases have required special investigation on the part of bureau employees, such as interviewing witnesses and examining railroad and other records. Five bureau employees were regularly assigned to this work, though the greater part of the work of collecting evidence and preparing and submitting reports is done by bureau employees at stockyard centers, in connection with their other duties. The enforcement of the so-called 28-hour law has resulted in better facilities being provided for the feeding, watering, and handling of live stock in transit.

TICK ERADICATION DIVISION.

The work for the suppression of Texas or tick fever of cattle and the extermination of the ticks which transmit it has again shown greater progress than in any previous year. This work is conducted through the Tick Eradication Division, of which Dr. R. A. Ramsay is chief, in cooperation with the authorities of the Southern States affected.

PROGRESS IN TICK ERADICATION.

Areas aggregating 79,217 square miles, having been freed of ticks, were released from quarantine during the fiscal year. This action makes available 93 counties and 33 parts of counties into which better-bred cattle from tick-free States may be safely introduced, with consequent increase in beef and in dairy products. The total area released since the beginning of this work in 1906 amounts to 458,529 square miles, which is nearly 63 per cent of the originally infected area. The work is also far advanced in a large additional territory. The following table shows the territory released during the past fiscal year:

Areas released from quarantine as a result of eradicating cattle ticks, fiscal year 1919.

State.	Square miles.	State.	Square miles.
Alabama.....	2,102	North Carolina.....	1,983
Arkansas.....	2,184	Oklahoma.....	8,749
Florida.....	4,745	South-Carolina.....	8,619
Georgia.....	7,618	Texas.....	19,725
Louisiana.....	23,492	Total.....	79,217

During the year 47,843,791 inspections or dippings were made of cattle for the eradication of ticks as against 34,927,959 in the preceding year. There were in operation 33,789 cattle dipping vats where cattle were dipped under Federal or State supervision to rid them of ticks.

A great deal of advance work pertaining to the construction of dipping vats and preparing counties and localities for regulatory tick-eradication activities in the near future was conducted with a view to proper organization for taking up and carrying on the work in new areas. Effectual cooperation has come from many sources and interests.

Until 1916 what is known as the local-option system was followed in nearly all States cooperating in tick eradication. Under this plan the systematic dipping of cattle every 14 days (which is necessary for the extermination of the parasite) could not be begun in a county until after an election had been called and held and a majority of the voters in the county had expressed themselves in favor of driving out the ticks. This plan was found to work well up to a certain point. That point was when the remaining counties would not vote for tick eradication and became a menace to the tick-free counties which were being stocked with purebred cattle not immune to tick fever. Mississippi affords an example of how this

condition was overcome. When 31 counties stood as an obstacle to further progress the farmers and live-stock men of the tick-free areas induced the legislature to enact a State-wide law requiring county officers within a certain time to provide dipping vats, dipping material, and men to supervise the dipping of all cattle every 14 days from April to November, inclusive, in 1917. The result was that the entire State was released from quarantine on December 1 of that year.

Observing the good results in Mississippi, Louisiana enacted similar legislation, which became effective April 1, 1918. Little opposition was met and such good work was accomplished that on December 1 of the same year 29 counties and parts of several other counties, in all an area of 23,492 square miles, were released from quarantine, and the work is so far advanced in all remaining quarantined areas that their early release seems assured.

Texas also has enacted a State-wide law, but because of the size of the State and the large tick-infested area a different plan has been adopted. The law divides the State into three zones and became effective January 1, 1919, in zone 1, which includes about 65 counties in the northeastern part of the State.

In Alabama there remained 24 counties which during the past two or three years on one or more occasions had refused to vote for tick eradication. The legislature enacted a State-wide law for compulsory dipping, effective March 7, 1919. The regular dipping of cattle was taken up in all the counties, and the State is approaching complete release.

The Georgia legislature enacted a State-wide law to become effective in December, 1919, and arrangements are now being made to enforce it.

Experience has proved that the principle of county or local option on the question of tick eradication is a good way of beginning the work in a State, but that eradication can be more quickly completed by the application of a State-wide law requiring all the tardy counties to take action at the same time in order that the ticks may not be permitted to remain in a few counties or localities and endanger the cattle industry in the areas already freed.

SHIPMENTS FROM QUARANTINED AREAS.

The number of cattle of the quarantined area shipped to market centers for immediate slaughter was 4,807,865, which is a considerable increase over the preceding year and was brought about by local conditions such as drought, which required the immediate marketing of many cattle. Moreover, many cattle owners in tick-eradication localities have shown a disposition to ship for slaughter as many unprofitable cattle as possible in preference to dipping them. This was done with a view of producing, after ticks were eradicated, better-bred animals likely to be more profitable for breeding purposes. "Dipped ticky cattle" to the number of 8,361 were shipped to points where inspection is provided and dipping facilities maintained, for further treatment for movement as noninfectious. At public stockyards 85,087 cattle were dipped and certified for movement as non-infected. For these shipments 1,673 certificates were issued.

At points other than public stockyards 89,616 cattle were inspected or dipped and certified for interstate movement as noninfected, as provided for in the regulations. To cover the shipments of these cattle 979 certificates were issued.

TUBERCULOSIS ERADICATION DIVISION.

The work of the Tuberculosis Eradication Division, in charge of Dr. J. A. Kiernan, chief, for the control and eradication of tuberculosis of live stock, has been extended to include active cooperation with 43 States. The live-stock sanitary officials of these States are extending all possible cooperation. States not cooperating with the department are in most instances unable to do so because of unsuitable laws or lack of funds. Cattle owners throughout the country, including those in States not doing cooperative work, are becoming more and more interested. The plan of accrediting tuberculosis-free herds of cattle and the law under which indemnity may be paid for reacting animals have been of great value in advancing the campaign. For carrying on its field work for the eradication of tuberculosis the bureau has offices in 33 cities in as many States, an increase of 10 during the fiscal year.

TESTING CATTLE FOR TUBERCULOSIS.

Under the supervision of bureau officers there were tested with tuberculin 329,878 cattle, of which 13,528, or 4.09 per cent, reacted. A summary by States is given in the accompanying table.

Summary of tuberculin testing of cattle in cooperative tuberculosis-eradication work.

States.	Cattle tested.	Cattle reacted.	Percent reacted.	States.	Cattle tested.	Cattle reacted.	Percent reacted.
Alabama.....	17,446	226	1.29	Nevada.....	479	18	3.75
Arkansas.....	495	10	2.02	New Hampshire.....	789	41	5.19
Colorado.....	976	25	2.56	New Jersey.....	2,789	255	9.14
Connecticut.....	1,917	141	7.35	New Mexico.....	48		
Delaware.....	602	31	5.14	New York.....	7,211	482	6.68
District of Columbia.....	1,264	8	.63	North Carolina.....	6,972	118	1.71
Florida.....	7,193	375	5.12	North Dakota.....	14,052	485	3.45
Georgia.....	9,858	265	2.67	Ohio.....	11,156	740	6.63
Idaho.....	1,039	14	1.34	Oklahoma.....	1,525	147	9.60
Illinois.....	10,247	872	8.50	Oregon.....	4,483	111	2.47
Indiana.....	7,001	211	3.01	Pennsylvania.....	8,323	412	4.61
Iowa.....	6,689	361	5.38	Rhode Island.....	424	79	1.86
Kansas.....	7,502	362	4.82	South Carolina.....	5,086	152	2.98
Kentucky.....	6,729	216	3.06	South Dakota.....	5,885	427	7.25
Louisiana.....	9,849	386	3.91	Tennessee.....	10,923	231	2.11
Maine.....	7,609	175	2.29	Utah.....	4,762	82	.17
Maryland.....	8,265	763	9.23	Vermont.....	14,684	1,146	7.79
Massachusetts.....	2,694	164	5.47	Virginia.....	19,561	562	2.87
Michigan.....	8,352	289	3.46	Washington.....	8,466	209	2.46
Minnesota.....	32,642	1,399	4.27	West Virginia.....	1,373	57	4.09
Mississippi.....	10,087	82	.81	Wisconsin.....	15,554	579	3.72
Missouri.....	1,232	69	5.60	Wyoming.....	3,704	16	.43
Montana.....	17,607	473	2.80				
Nebraska.....	4,014	242	6.02	Total.....	329,878	13,528	4.09

The District of Columbia gives an illustration of what may be accomplished during a term of years by the systematic testing of cattle for tuberculosis and properly disposing of reactors. Work of this kind has been under way in the District for 10 years. At the be-

ginning of this period the tuberculin test showed that 19 per cent of the cattle were tuberculous. During the past fiscal year 1,264 cattle in the District were tested and only 8 reactors obtained, a percentage of 0.63. Three hundred and seventy cattle in interstate movement were also tested for admittance into the District of Columbia, and of this number 30, or about 8 per cent, were found to be infected with tuberculosis.

INSPECTION AND TESTING FOR INTERSTATE MOVEMENT.

During the year there were inspected by bureau veterinarians, in compliance with the laws of the States to which the animals were destined, 41,609 cattle moved interstate for purposes other than immediate slaughter, of which 40,586 were tested with tuberculin. Of the number tested 1,182 reacted.

ACCREDITED TUBERCULOSIS-FREE HERDS.

The movement to establish and maintain a list of herds of purebred cattle officially accredited as being free from tuberculosis has met with wide favor among herd owners and is spreading rapidly. The plan, in brief, is to test the cattle with tuberculin at the request of the owner, to eliminate any reacting animals either by slaughter or by following prescribed sanitary measures, to repeat the test at prescribed intervals, and to list as tuberculosis-free accredited herds all herds entitled to that distinction. Official certificates are issued to the owners of such herds. Two lists of accredited herds have been compiled and printed. Up to April 1, 1919, a total of 782 herds, containing 12,082 purebred and 6,939 grade animals had been fully accredited, and 6,535 herds comprising 39,558 purebred and 57,685 grade animals had been listed as having passed one test.

CATTLE SLAUGHTERED AND INDEMNITY PAID.

October 1, 1918, funds became available to the bureau for the payment of indemnity for tuberculous animals slaughtered in the work of eradication. Indemnity was paid partly by States and partly by the Federal Government. The accompanying table gives statistics of cattle slaughtered, appraisal, indemnity, salvage, etc.

Cattle slaughtered, appraised value, indemnity allowed, and salvage realized in work of tuberculosis eradication, October 1, 1918, to June 30, 1919.

State.	Number of cattle.	Average appraisal per head.	Total State indemnity.	Total Federal indemnity.	Average State indemnity per head.	Average Federal indemnity per head.	Average salvage per head.
District of Columbia....	7	\$100.00		\$135.00		\$19.29	\$39.64
Idaho.....	5	160.00	\$129.66	129.66	\$25.93	25.93	23.85
Indiana.....	28	184.82	1,155.86	966.77	41.28	34.52	59.15
Iowa.....	1	167.00	34.00	25.00	24.00	25.00	65.00
Kansas.....	252	270.33	19,617.41	10,145.50	77.85	40.26	73.31
Kentucky.....	176	202.20	15,678.79	5,589.72	89.08	31.76	30.39
Maine.....	91	114.84	3,751.46	2,025.60	41.22	22.26	25.30
Maryland.....	502	90.72	7,713.82	7,713.84	15.37	15.37	47.14
Michigan.....	100	245.80	9,255.00	4,475.43	92.55	44.75	79.58
Minnesota.....	728	94.85	25,142.09	8,626.59	34.54	11.85	46.98
Missouri.....	18	198.61	551.54	547.53	30.64	30.42	72.31
Montana.....	83	80.00	4,750.13	1,604.60	57.23	19.33	20.06
Nebraska.....	73	299.18	3,099.87	3,097.87	42.46	42.43	64.15
Nevada.....	15	130.66	681.36	358.11	45.42	23.87	27.56

Cattle slaughtered, appraised value, indemnity allowed, and salvage realized in work of tuberculosis eradication, October 1, 1918, to June 30, 1919—Continued.

State.	Number of cattle.	Average appraisal per head.	Total State indemnity.	Total Federal indemnity.	Average State indemnity per head.	Average Federal indemnity per head.	Average salvage per head.
North Carolina.....	38	\$188.29	\$1,075.98	\$1,075.98	\$28.32	\$28.32	\$60.80
North Dakota.....	37	59.46	1,323.52	662.39	35.77	17.96	10.11
Ohio.....	293	147.17	12,323.53	4,820.79	69.70	23.75	57.89
Oklahoma.....	4	300.00	459.24	200.03	114.81	50.00	70.39
Oregon.....	7	149.35	312.50	269.34	44.64	37.19	37.78
Pennsylvania.....	120	153.96	5,137.15	3,515.69	42.81	29.30	40.55
Rhode Island.....	6	257.00	181.83	168.83	30.31	28.14	42.69
South Carolina.....	22	97.50	480.59	480.59	21.85	21.85	31.97
South Dakota.....	193	168.16	7,223.14	4,943.71	37.43	25.62	43.42
Utah.....	34	192.06	663.33	663.33	19.51	19.51	41.18
Vermont.....	829	75.74	32,325.81	14,736.46	38.99	17.78	19.32
Virginia.....	11	350.00	293.91	293.91	26.72	26.72	53.48
Washington.....	49	99.93	1,024.73	989.73	20.91	20.20	26.27
West Virginia.....	10	120.00	522.48	238.80	52.25	23.88	42.21
Wisconsin.....	2	200.00	50.68	50.68	25.34	25.34	74.66
Total.....	3,644	127.82	154,959.39	78,542.45	49.92	21.94	41.49

DIVISION OF HOG-CHOLERA CONTROL.

The Office of Hog-Cholera Control was made a division in April, 1919, and Dr. U. G. Houck was appointed chief of the division to fill the vacancy created by the resignation of Dr. O. B. Hess.

COOPERATIVE WORK FOR CONTROL OF HOG CHOLERA.

The work for the control and suppression of hog cholera progressed along the lines of the preceding year, in cooperation with the regulatory authorities and the extension divisions of agricultural colleges in 34 States where hog raising forms an important part of the farming activities. For a time as many as 180 bureau veterinarians were assigned to hog-cholera control work, but the average for the year was about 135.

Through the increase of the field force, which was made possible by the increase of funds from the war emergency appropriation, the swine industry received more protection against losses from hog cholera than ever before. Notwithstanding an increase of over 4,000,000 above the number of hogs in the preceding year as a result of efforts to stimulate production, besides the abnormal conditions that prevailed as a consequence of the war, the mortality of swine from all diseases showed a slight decline, from 42.1 per 1,000 in 1918 to 41.4 per 1,000 in 1919, or about 37 per 1,000 from hog cholera. This is the lowest point recorded in 36 years.

Hogs shipped from public stockyards into the various States for feeding purposes were kept under observation at destinations for a time to observe the results of the hog-cholera preventive treatment administered at the yards before shipment. The observation of these animals added materially to the duties of both bureau and State inspectors, as 614,673 feeder hogs were immunized at public stockyards and shipped, which was a great increase over any previous year.

Many garbage-feeding stations in the vicinity of large cities and military and naval camps were kept under observation, as such places are always liable to become centers of infection.

SUMMARY OF ACTIVITIES.

During the year 12,336 outbreaks of hog cholera were reported to the bureau inspectors by county agents, live-stock owners, and others. These outbreaks were investigated in cooperation with the State authorities. Under the direction of those authorities 9,564 farms were quarantined on account of outbreaks of the disease, and 4,382 were cleaned and disinfected. A total of 51,022 farm investigations were made on infected and adjacent premises, and 53,586 post-mortems were held to determine the nature of the disease that existed among the animals on the farms visited by the inspector.

Literature on the subject of hog cholera was widely distributed, and 2,734 meetings were held in hog-raising districts for the purpose of forming organizations and giving information and instructions to live-stock owners concerning quarantine, sanitation, and the serum treatment as successful means for preventing losses from hog cholera. These meetings were attended by 78,584 farmers and others. In addition, the inspectors held personal interviews with 315,359 live-stock owners, veterinarians, county agents, bankers, and others.

In all, 93,512 farms were visited by the bureau inspectors, at the request of the owners or otherwise, to observe the condition of live stock and to give advice and other assistance.

To demonstrate to veterinary practitioners and others the proper technique in administering the protective serum treatment, 233,987 hogs were treated.

Veterinary practitioners and others trained to administer the hog-cholera preventive treatment, and working in cooperation with the bureau forces, reported the treating of 5,474,685 hogs in the 34 States where bureau veterinarians are stationed. Since it is estimated that less than 50 per cent of the hogs treated are reported to the State and bureau authorities, it is conservatively estimated that the treatment was administered to more than 12,000,000 hogs in the United States during the year. A notable effect of the year's work during the past year has been the great increase in the use of serum by hog owners.

PATHOLOGICAL DIVISION.

The scientific investigation of animal diseases has been, as heretofore, the principal work of the Pathological Division, under the direction of Dr. John S. Buckley, chief. In addition, the division has studied the poisoning of live stock by plants, has aided in the supervision of viruses, serums, and other stock remedies, and has carried on certain routine work relating to diseases of animals.

INFECTIOUS ABORTION.

The study of infectious abortion has been continued in an effort to acquire further information that may be advantageously utilized in combating this serious malady. The manner in which the disease is introduced into abortion-free herds is regarded as sufficiently well understood to enable stock owners and dairymen by practicing reasonable precautions to keep healthy herds clean; but the control and elimination of the infection after it has made its appearance continues to be a perplexing problem.

Increased interest has more recently been manifested in methods of artificial immunization as a result of experiments conducted by

English investigators where promising results followed the employment of a living abortion-organism vaccine administered shortly before the animals were bred. A considerable amount of experimental work has been conducted along similar lines during the last two years. When a limited number of susceptible animals were utilized in an experimental capacity the results strongly indicated that protection could be conferred, but when the same method was applied to upward of 600 animals in an infected herd only a very slight reduction in abortion losses was accomplished. Results have indicated that only susceptible animals derive possible benefit from the method, no decrease in losses having resulted from the treatment of animals giving positive reactions. While the results obtained under experimental and herd conditions were somewhat contradictory, sufficient evidence that immunity was conferred in some instances was obtained to justify further immunizing investigations.

Additional evidence was obtained that bulls giving positive reactions to the abortion tests may harbor abortion infection in their generative organs and that the presence of the infection may be associated with definite lesions. The findings in five cases are described in a paper appearing in the *Journal of Agricultural Research*.

While abortion disease up to the present time appears to have interfered to only a slight extent with the swine industry, further evidence has been obtained that abortion infection is capable of causing losses in some instances in hogs. The presence of the infection was definitely established in one outbreak in Indiana, and on six other farms in the same State where abortion losses had been heavy among sows abortion infection was indicated by positive agglutination reactions.

Serological tests have been applied to several hundred samples of blood serum from suspected cases, and the definite knowledge thus gained as to the presence of the disease in many cases has enabled cattle owners to adopt appropriate control measures.

Cooperative research work by investigators at the veterinary department of Cornell University, in connection with an outbreak of disease in a flock of 235 Merino ewes where 50 per cent or more aborted or produced immature lambs, disclosed as the probable causative factor a spirillum, a type of microorganism not hitherto recognized in this country as associated with ovine abortion, although a similar type of organism had been previously isolated from aborting cows in this division. Severe abortion losses in sheep in Great Britain have been attributed to a similar if not identical type of infection. The losses from ovine abortion in this country up to the present time have been slight.

BACILLUS X AND EQUINE INFLUENZA.

An organism morphologically and culturally closely resembling *Bacillus subtilis*, and designated as Bacillus X by its discoverer, has been incriminated as a factor in the cause of equine influenza, and studies have been made of that organism in relation to the disease. Results of investigation show that no serological relationship exists between Bacillus X and *B. subtilis*. Large doses of Bacillus X failed to produce any evidence of disease when injected into guinea

pigs, rabbits, or horses. Agglutinins and specific complement-fixing bodies are demonstrable in hyperimmune serum.

In a test for toxin production, horses were temporarily discomforted by large injections of sterile bouillon filtrates of this organism, after which the animals remained normal. Guinea pigs and rabbits showed no ill effects from injections of this filtrate. The filtrate showed distinct antigenic properties when used as an antigen against serum from horses hyperimmunized against *Bacillus X*.

Complement-fixation tests with *Bacillus X* as an antigen, on a limited number of serums for animals affected with influenza or recently recovered from that disease, resulted in negative reactions in all cases. Several of these serums in low dilutions showed some agglutinating power against *Bacillus X* suspension. This same agglutination was also evidenced in certain normal horse serums in which exposure to influenza infection could be reasonably excluded.

DOURINE INVESTIGATIONS.

The complement-fixation test has continued to be extensively employed for the diagnosis of dourine of horses, 46,819 samples of serum having been tested, of which 1,143, or 2.4 per cent, gave positive reactions.

Experiments are being made on drying trypanosome suspensions for the purpose of preparing permanent dourine antigens of unvarying titer. Out of three lots of trypanosomes dried, one retained its antigenic value for one year at low temperature and in vacuum, but lost all antigenic value after three months' exposure to room temperature and air.

OTHER RESEARCH WORK.

In cooperation with the Bureau of Chemistry, experimental studies were made with a strain of *Bacillus botulinus* isolated from home-canned asparagus. As an antitoxic serum effective against a strain of the bacillus isolated from cheese afforded no protection to animals injected with toxin from the asparagus strain, experiments are being made for the production of what is known as a polyvalent serum against botulism.

Bacteriological and biochemical studies of conditions in culture media and living tissue which favor the development of toxins and aggressions by the blackleg bacillus are in progress.

Seven cases of spontaneous tumors in white mice were examined, and from this material experiments in the transplantation of tumor particles and the breeding of mice have been undertaken in cooperation with the Biochemic Division with the object of further research work on tumors.

A series of experiments with butter-coloring matters including Jersey yellow, Sudan diazo-anido-benzine, etc., was undertaken in cooperation with the Bureau of Chemistry, to observe the effect on the skin. Microscopic studies were made of the cutaneous structures of experimental animals. The results proved the irritant action on the peripheral as well as the deeper parts of the skin.

Eleven samples of animal tissue and stomach contents were examined for poisons. In three tissues from a smelter region, zinc was found in two and lead and zinc in the third.

EXAMINATIONS FOR TUBERCULOSIS.

Specimen tissues from 176 cattle that had reacted to the tuberculin test but in which no visible tuberculosis growths had been found on ordinary post-mortem examination, were referred to the Pathological Division for final diagnosis. Tubercle bacilli were demonstrated in 85 cases, while none could be found in the specimens from the remaining 91.

GLANDERS.

Cooperative work for the control of glanders in various States was continued. The complement-fixation test was applied to 695 samples of serum forwarded by various State officials and practicing veterinarians; 174 of these samples gave positive reactions to the test, a per cent of 24.8.

RABIES.

Specimens submitted for examination for rabies came principally from Maryland, Virginia, West Virginia, Tennessee, and the District of Columbia. The number of cases in the District has perceptibly diminished. Of 117 suspected cases a positive diagnosis was made in 75, and in one case the material was so decomposed that no diagnosis was possible. The positive cases were 69 dogs, 1 cat, 4 cattle, and 1 sheep. A considerable number of persons, as well as a number of animals, had been bitten by the affected animals. In every instance in which a person had been bitten, animal inoculation was made when the microscopic findings were negative.

BLACKLEG VACCINE.

Vaccine for immunizing cattle against blackleg is still in great demand. During the year, 3,339,815 doses were distributed free of charge to stock owners. The powdered form of vaccine that has been prepared by the bureau for many years is the only form distributed. Filtrates and aggressins, which many stockmen find very satisfactory in the immunization of their calves against blackleg, are being submitted to very careful tests to see that they possess the required protective qualities.

EXAMINATION OF BIOLOGICAL PRODUCTS.

Cooperating with the Office of Virus-Serum Control, which conducts the regulatory work in connection with the supervision of veterinary biological products under the virus-serum-toxin law, the Pathological Division has continued to carry out the testing of certain products. During the year there were submitted for examination 139 samples representing 30 different kinds of serums, bacterins, vaccines, and germ-free filtrates. Forty-two of these, or 30 per cent, were rejected for reasons such as contamination with foreign organisms or their products, insufficient attenuation of bacteria used in vaccines, and lack of potency. Three hundred and thirty-seven cultures of organisms intended for use in the manufacture of biological products were also examined, of which 72, or 21 per cent, were rejected because of contaminations and atypical cultural characteristics. The division also furnished to biological houses from its stock cultures many organisms of various types to be used in the manufac-

ture of their products. The suggestions made to the various firms relative to their products, together with the report of the division findings in each instance, have served to induce greater accuracy in identifying cultures and testing their products, as it is exceedingly rare to find a second sample unsatisfactory to test. The effect of such work is to exclude from the market unsuitable and impotent products and in some instances products that are even dangerous to the live-stock industry.

POULTRY DISEASES.

Extensive outbreaks of a highly infectious disease of poultry were reported from some of the Eastern States. Carcasses of fowls submitted to the laboratory for examination were found to be affected with fowl typhoid, a disease quite similar to fowl cholera, though caused by a different microorganism. In severe outbreaks it is almost as destructive as cholera. Information as to methods for control were given through bulletins and correspondence.

Avian material forwarded to the laboratory for diagnosis showed a variety of diseased conditions, the more important of which were white diarrhea of chicks, diphtheria and chicken pox, enterohepatitis or blackhead of turkeys, avian tuberculosis, and coccidiosis. Experiments were conducted to determine the relationship of coccidiosis of fowls and cattle. Fowls fed on material containing coccidia from cattle failed to develop coccidiosis.

AUTOPSIES ON WILD ANIMALS.

During the year 80 specimens of wild animals were received from the National Zoological Park (D. C.) for post-mortem examination. Of 45 birds examined there were 12 cases of enteritis, 2 of septicemia, 1 of peritonitis, 1 of sarcomatosis, 1 of parasitism, 1 of anemia, 1 of ptomaine poisoning, 2 of hemorrhage, 13 of tuberculosis, 3 of aspergillosis, 1 of cecal necrosis, and 7 undetermined. Of 35 mammals there were 5 cases of pneumonia, 1 of bronchopneumonia, 1 of pleurisy, 3 of enteritis, 2 of gastroenteritis, 4 of septicemia, 1 of peritonitis, 2 of tumors (adenomata sarcoma), 1 of parasitism, 3 of anemia, 1 of septic metritis, 7 of tuberculosis, 1 of prolapse of rectum, and 3 destroyed as unfit for exhibition (1 paraplegia, 1 extensive local infection of intermaxillary region, 1 severely injured).

PLANT POISONING OF STOCK.

In the investigation of poisonous plants nearly all the field experimental work has been conducted at the experiment station near Salina, Utah (provided by cooperation of the Forest Service), while most of the laboratory work has been done at Washington. The Bureau of Plant Industry has cooperated in the study of the plants. Its representative not only identifies the plants studied but carries on field investigations on their distribution and habits.

The work of chemical investigation of plants, begun in the preceding year, was considerably extended and advanced. More extended work was done also on the pathology of the diseased animals, and this has added to the knowledge concerning the effects of the poisonous principles.

A large number of plants have been under investigation. Special attention was paid to the "whorled milkweed" (*Asclepias galioides*),

which occasions extremely heavy losses of domestic animals in Colorado and adjoining States, and a bulletin on this plant has been prepared for publication. Further work was conducted on the sneezeweed (*Dugaldia hoopesii*), and additions were made to the number of known loco plants. An investigation was also made of a plant growing in the Southern States, *Daubentonia longifolia*, which seems to be an important sheep-poisoning plant in Texas.

Among publications of the year was Department Bulletin 575, "Stock-Poisoning Plants of the Range," a popular treatise, with colored illustrations, intended to aid stockmen in recognizing and identifying such plants.

BRANCH LABORATORIES.

The branch pathological laboratories at Chicago, Omaha, and Denver have continued their work, which consists principally in making diagnoses of obscure cases arising in the meat inspection.

The Chicago laboratory also collected and examined a number of samples of water from various meat-packing establishments, made a report upon the existence of the avian type of tuberculosis in swine, and conducted some experiments with reference to the transmissibility of so-called hyperplasia of the bone marrow in cattle.

The Omaha laboratory received and examined 308 specimens representing the usual variety of routine diagnoses. Examinations for tuberculosis and hemorrhagic septicemia have increased, the former due to cases of slaughter following reaction to the tuberculin test. The similarity of lesions found in cases of certain affections of swine to lesions of hog cholera made diagnosis sometimes difficult.

Investigations pertaining to abortion disease have been made by the branch laboratory at Ithaca, N. Y.

BIOCHEMIC DIVISION.

The work of the Biochemic Division, under Dr. M. Dorset, chief, comprised chiefly, as before, investigations concerning hog cholera, laboratory research work relative to meat products, studies of dips and disinfectants, and the preparation of tuberculin and mallein.

HOG-CHOLERA INVESTIGATIONS.

The investigative work on hog cholera has been continued under three general heads: (1) Methods of producing immunity, (2) modes of spread of the disease, and (3) the causes of hog cholera and related diseases.

METHODS OF PRODUCING IMMUNITY AGAINST HOG CHOLERA.

Some additional work has been done with methods for refining old hog-cholera serum (defibrinated blood). The method referred to in last year's report, consisting in the addition to old serum of strong solutions of sodium chlorid, followed by heat with aeration, has been used further and found apparently satisfactory. It has been found also that the use of strong solutions of sodium chlorid may be dispensed with when the serum is diluted with several volumes of 1 per cent salt solution, containing a sufficient amount of phenol to produce a concentration of one-half of 1 per cent in the final mixture. This diluted serum is heated and aerated as in the other method. It has

been found possible by this process, which includes filtration and precipitation of the globulins and antibodies, to refine and concentrate old defibrinated-blood antitoxin.

A further study of the effect of phenol (0.5 per cent) on the tuberculosis bacillus has indicated that the phenol alone can not be depended upon to destroy that organism in clear serum or in defibrinated blood, though it appears, after prolonged contact, either to attenuate the bacilli or to reduce the numbers very materially.

As a means of overcoming difficulty experienced by commercial firms in effectively maintaining proper temperatures in heating serum, the division has devised a method which makes it possible to heat serum at a definite temperature for any desired period of time without the use of the thermoregulator customarily employed. This is accomplished by the use of a double-jacketed kettle, the outer jacket of which contains a liquid which boils at a temperature exactly sufficient to maintain the desired degree of heat in the serum itself.

Some progress has been made in the study of the duration of immunity in suckling pigs. One hundred and thirty-nine pigs given the simultaneous inoculation when very young (less than 3 weeks, some of them but 1 week old) were exposed to hog cholera by the injection of virus six months after simultaneous inoculation. Three of them died, but it was not possible to establish that even they died of hog cholera.

Experiments by the division have shown that the condition of the immune hogs which serve as serum producers is of prime importance in the production of potent serum. The influence which the time elapsing between immunization and hyperimmunization might exert upon the potency of the serum produced was studied and at the same time studies were made of diluted and laked virus blood as hyperimmunizing agents. The experiments show that hogs which are hyperimmunized within a short interval after a simultaneous inoculation do not produce serum of satisfactory potency; also that as a rule the ability of hyperimmunized hogs to yield potent serums increases within certain limits as the interval between immunization and hyperimmunization increases. The conclusion was therefore reached that an interval of not less than seven weeks should be allowed to elapse between immunization and hyperimmunization, and that the most uniformly satisfactory results will be obtained by allowing at least three months. The ability of immune hogs to respond to hyperimmunization to the desired degree, once acquired, remains unimpaired for at least a year. It was found also that simultaneous inoculation of nonimmune pigs with serum and virus is followed almost immediately by a remarkably firm immunity, so that they are able to withstand enormous doses of virus blood within a day or two after simultaneous inoculation; hence there is no evidence of a state of hypersusceptibility to hog cholera following simultaneous inoculation. Diluted and laked virus blood was found not to possess any advantages over the undiluted blood. A full report of this work has been published in the *Journal of the American Veterinary Medical Association* (vol. 8, n. s., p. 259).

MODES OF SPREAD OF HOG CHOLERA.

Studies of the relation of insects to the spread of hog cholera have been continued. Studies of the hog louse (*Hematopinus suis*) have indicated that this parasite is incapable, under ordinary conditions, of transmitting the virus of hog cholera. Most of the work during the year related to the spread of hog cholera by means of flies, the common house fly (*Musca domestica*) being used as a representative of the nonbiting fly, and the stable fly (*Stomoxys calcitrans*) as a representative of the biting fly. Both species are commonly found about hog pens, and both are capable of traveling considerable distances. It was learned that individual house flies which feed upon the eye secretions or blood of sick pigs may harbor the virus of hog cholera for some days at least, and may convey the disease to healthy pigs by feeding on their eyes or on fresh wounds on their skins; yet other experiments with nonimmune pigs which were placed in screened pens in which infected house flies were liberated in considerable numbers, without the production of a single case of infection, leave a very grave doubt as to whether under natural conditions the house fly is concerned in the dissemination of hog cholera. Likewise it was demonstrated that it is possible for the stable fly to convey infection, either by feeding upon the ears of infected pigs and then biting nonimmune pigs, or by becoming gorged with the blood of sick pigs and then being killed and placed in the feeding trough of nonimmune pigs; but it yet remains to be determined whether this insect is a factor of practical importance in the spread of the disease. Attempts were made to transmit hog cholera by means of mosquitoes, but the experiments were unsuccessful. A summary of a large part of these investigations was published in the Twenty-Second Annual Report of the United States Live Stock Sanitary Association, page 164.

In continuation of work reported last year, four experiments were made under farm conditions in the vicinity of Ames, Iowa, to determine how long the virus of hog cholera persists in pens after the removal of sick pigs. On four farms where hog cholera existed all hogs were removed and susceptible pigs were placed in the vacated lots after intervals of 24 hours, 48 hours, 7 days, and 10 days, respectively. In the first case, 1 of the 6 susceptible pigs sickened on the eighth day following exposure and communicated the disease to the others. In the 48-hour and 10-day experiments all the susceptible pigs remained well. In the 7-day experiment 1 sickened and died, though it could not be determined definitely whether it had contracted cholera, while the other 5 remained well. These experiments are merely the beginning of a line of work which seems to be of practical importance and which it is planned to continue as opportunity is found.

CAUSE OF HOG CHOLERA AND RELATED DISEASES.

In the fall of 1918 investigations of diseases related to hog cholera and resembling it were begun. An infection of this character appeared on a farm near Ames, Iowa, among shoats which had previously been given the simultaneous inoculation against hog cholera. The animals presented many of the symptoms commonly seen in cases of hog cholera, but investigation proved that it was a different

disease, as hogs which were firmly immune against hog cholera contracted the other disease when exposed in the infected lots. The main characteristics of the disease were an inflammation of the large intestines, which showed on dissection a superficial layer of necrosis on the mucous surface, while beneath this there was a zone in which hemorrhage was more or less marked. The condition thus observed was no doubt what has been commonly termed necrotic enteritis. Microscopic examination revealed in the zone beneath the necrotic area typical threads of *Bacillus necrophorus*. Rabbits inoculated with bits of the diseased intestine developed typical necrophorus infection. The disease seems to be increasing in prevalence in certain of the Western States, and further efforts are being made to discover its cause and means of prevention.

DIPS AND DISINFECTANTS.

The laboratory of dips and disinfectants received for examination 131 samples of stock dips, disinfectants, and miscellaneous materials.

During the calendar year, 1918, there were sent to inspectors in the field 804 test outfits for arsenical dips and sufficient supplies for making 584,500 tests; 9 test outfits for lime-sulphur dips and supplies sufficient to make 3,200 tests; 13 test outfits for nicotin dips and supplies sufficient for making 2,970 tests. There were thus provided a total of 826 new testing outfits together with supplies sufficient to make a total of 590,670 tests.

In research work a comparison was made of the relative advantages of arsenious oxid and iodine, both of high purity, as standard substances in iodimetry. The results were published in the *Journal of the American Chemical Society* (vol. 41, p. 351).

Considerable work has also been done on a study of methods for evolving gaseous formaldehyde for disinfecting purposes, and it appears that less expensive methods than the potassium permanganate method will be found appropriate. This work is being continued.

Of the various substances used in dipping animals the compound cresol solutions are the only ones for which no suitable field test is available. The field test, which affords a means by which the inspector in the field may assure himself that the dipping bath after completion is of the proper strength, is considered highly important in carrying on field dipping operations successfully. For that reason considerable study has been given to the development of a method for testing cresol solutions in the field. A method of field testing has been devised which appears to be sufficiently promising to warrant an early trial of it in the field.

The laboratory has also carried on experiments to find a substitute for linseed oil, which is now scarce and high priced, and which has been required heretofore in the preparation of compound solution of cresol and of saponified cresol solutions. It has been determined that soy-bean oil, or the fatty acids derived therefrom, are well adapted for the purpose and may be used at a considerable saving in cost.

Some additional work has been done upon problems relating to the disinfection of hides and of tannery effluents, relating particularly to the effect of heat and of chlorine upon anthrax spores in the effluent from soak vats. The results obtained do not differ materially from those heretofore reported.

A comparative study has been made of the germicidal value of Dakin's solution, eusol, chloramine T, and chlorin in aqueous solution. This work indicates that these different disinfectants vary in their action upon different microorganisms. A study has been made also to determine the effect of lime upon the germicidal efficiency of phenol and cresol. Lime seems to lower distinctly the germicidal value of both of these disinfectants.

RESEARCH WORK ON MEATS AND MEAT PRODUCTS.

The nature of the research work on meats was changed in order to meet war conditions, and investigations that had been undertaken with a view to the conservation of materials used in the curing of meats were continued and completed. It was established that high-grade meat can be cured as well in sterilized old pickle, properly strengthened, as in new pickle. It is entirely practicable, therefore, instead of discarding pickling solutions after use, to clarify, sterilize, and strengthen them and then use them again, with a considerable saving in the ingredients. Examinations showed that pickle after use still contained approximately, from 52 to 67 per cent of the original content of salt, from 44 to 74 per cent of the sugar, and from 41 to 80 per cent of the sodium nitrate.

An attempt was made to determine whether the entire quantity of sucrose (cane or beet sugar) used in curing meats could be replaced by some other sugar, so as to release the cane and beet sugar for general household purposes. Inquiry developed that there is generally an ample supply of substitutes for granulated sugar in the form of (1) "refiners' sirup," a by-product resulting during the manufacture of granulated sugar, and (2) corn sugar or dextrose, which is produced in several different grades. Practical curing experiments with meats in which several grades of corn sugar and refiners' sirup were compared with granulated sugar (sucrose) were carried out in four different meat-packing establishments. Nineteen tierces of hams, 19 tierces of sweet-pickled bellies, 9 boxes of fancy breakfast bacons, and 10 tierces of beef hams were cured. In these experiments several commercial grades of corn sugar or dextrose gave as good results as granulated sugar in the curing of hams, sweet-pickled bellies, and beef hams. The corn sugar did not appear to give quite as fancy a grade of bacon as the granulated sugar, but the results in this respect are inconclusive. The differences observed were largely due to slight variations in color, the bacon cured with corn sugar tending to become somewhat browner when fried than that which was cured with cane sugar. The refiners' sirup yielded satisfactory results in the curing of hams and sweet-pickled bellies (in fact it is now used to a considerable extent for this purpose), but it did not seem to give as good results in the curing of beef hams. On the whole, the results of this investigation indicate that corn sugar and refiners' sirup can be used successfully in the curing of pork in place of cane or beet sugar, and that if the need for rigid conservation of our sugar supply should again arise the entire quantity of sucrose ordinarily used in curing pork could be diverted to other uses without harm to the industry.

Investigations to determine the fitness of certain inedible oils as substitutes for lard oil as an ingredient in railway signal oil were terminated during the year. Signal oil is used largely in railway

trainmen's lanterns, the oil in most general use consisting of about 75 per cent of a standard grade of petroleum and 25 or 30 per cent of lard oil or sperm oil. Studies were made of whale oil, menhaden oil, and rapeseed oil as substitutes for lard oil. Extensive tests were made in the laboratories and practical tests were made through the cooperation of three of the large railway systems. Indications are that whale oil and menhaden oil are not well suited for the purpose. Rapeseed oil gave fairly satisfactory results in laboratory tests, but railway officials were of the opinion that signal oil made with it as a substitute for lard oil is inferior to the usual mixture of lard oil and petroleum oil. In view of those facts and because the emergency created by the war had passed, these experiments were discontinued.

The investigations in drying meats have likewise been discontinued, as there seems to be no pressing demand for meats in dried form since the conclusion of the war. The studies were carried far enough to indicate that meats could be dried and preserved in a dry state in edible form if this should become necessary.

A report on the composition and identification of meat extracts was contributed to the *Journal of Agricultural Research* (vol. XVII, No. 1, April 15, 1919). This paper, which is intended especially for chemists, health officers, and food-control officials, who have to consider the purity and proper labeling of meat extracts, contains much new information and gives directions for distinguishing extracts of different origins.

TUBERCULIN AND MALLEIN.

There were furnished to various Federal, State, county, and city officials 2,359,004 cubic centimeters of tuberculin for subcutaneous injections, an increase of about 46 per cent over the amount distributed during the preceding fiscal year; also 19,500 disks for the ophthalmic test for tuberculosis and more than 5,000 doses of ophthalmic tuberculin in liquid form. In addition 26,000 doses of intradermic tuberculin were prepared and distributed to various bureau representatives in the field. The ophthalmic and intradermic tuberculins were produced in an experimental way, but are not yet available for general distribution. The methods used in the production of these two special tuberculins have been developed as the result of the division's research work, which is still proceeding, with the object of producing a more efficient and active tuberculin than any heretofore available.

Laboratory investigations are being conducted to determine the influence of different nutrient materials upon the growth and activity of the tubercle bacilli, the object being to simplify and at the same time to improve the methods of cultivating those organisms in the production of tuberculin on a large scale.

The amount of mallein distributed has shown a great increase, due for the most part to the requests of the War Department. There were furnished to that department 1,275,680 doses of ophthalmic mallein and 1,655,130 doses of intradermic mallein, a total of 2,930,810 doses, while 113,750 doses of ophthalmic mallein were sent to State and Federal officials, making a grand total of 3,044,560 doses, an increase of 75 per cent over the amount distributed during the preceding fiscal year.

OTHER WORK.

Cooperative work with the Insecticide and Fungicide Board in the examination of insecticides and fungicides intended for use in the treatment of diseases of horses, cattle, sheep, swine, and goats has been continued. Sixty-three samples were examined, of which 39 were found to be misbranded or misbranded and adulterated. Thirty-five hearings were held by inspectors in charge in the Bureau of Animal Industry in various parts of the country, and a large number of cases were examined to determine the correctness of efficacy claims made on labels.

ZOOLOGICAL DIVISION.

The Zoological Division, under Dr. B. H. Ransom, chief, has continued the investigation of parasitic diseases of animals, and the study, collection, and determination of animal parasites.

ROUNDWORMS OF SHEEP.

At the bureau farm near Vienna, Va., experiments to determine methods of rearing lambs free from parasites, or as nearly free as practically possible, have been continued. Successful results have been obtained repeatedly by dosing the ewes with 1 per cent copper-sulphate solution in the spring before turning them out to pasture with their lambs, after which the lambs with or without the ewes are changed every two weeks to fresh pasture. If kept on separate pastures from the ewes the lambs until weaning are allowed in the stable with the ewes at night and during a period in the middle of the day. For pasture, fields of appropriate size planted in various forage crops are used; also, when available, fields from which crops have been removed in the course of regular farming operations. No fields are used that have been occupied by other sheep since cultivation unless at least a year has elapsed since such occupancy. During the fall and winter the lambs may be allowed to remain on the same field for longer periods—one or two months or even longer—and during the next spring and summer they are also moved to fresh pasture only occasionally. This method does not entirely prevent infection, but the number of stomach worms and other roundworms is kept down to such an extent that they cause no apparent injury. Experiments are now in progress relating to a method under which the lambs are changed to fresh pasture only every three weeks during the summer. The question of preventing or minimizing tapeworm infestation is also being studied.

ROUNDWORMS OF HOGS.

Investigations on the common intestinal roundworm of hogs (*Ascaris lumbricoides* or *A. suum*) have been continued. Supplementing laboratory experiments, a study of conditions in the field has been made. It has been found that ascariasis in pigs is of great importance as a cause of death and stunting of growth. Invasion of the lungs by the larvæ of *Ascaris* commonly causes pneumonia, the symptoms of which are popularly known as "thumps." Even if a pig survives the invasion of the lungs by the young parasites he receives a setback from which he never fully recovers, but remains in poor condition, fails to grow at the normal rate, and at an age when he should weigh 100 pounds may weigh less than 50 pounds, sometimes

less than 20 pounds. Under the usual conditions under which hogs are kept a considerable proportion of the young pigs die from ascariasis and many others are stunted in growth, so that the sum total of loss throughout the country is enormous. Methods of management to prevent losses from this cause are under investigation, and sufficient progress has been made to justify the belief that with comparatively simple precautions the damage caused by *Ascaris* can be reduced on any farm to an inconsequential amount. Several papers reporting the results of investigations on *Ascaris* have been published during the year.

TREATMENT AND CONTROL OF EXTERNAL PARASITES.

HOG MANGE.—Investigations thus far have shown that hog mange is spread mainly by direct bodily contact, that it spreads very rapidly among hogs of low vitality kept in small inclosures, that it spreads slowly among vigorous animals kept in pastures or in clean, well-lighted, roomy pens or buildings: that if not controlled there is a heavy loss from shrinkage, as well as from a high death rate: and, finally, that it can be eradicated by four dippings in a lime-sulphur or arsenical solution with intervals of six or seven days between dippings.

HOG LICE.—In experimental work one dipping or treatment with crude petroleum or cottonseed oil usually proved effective in eradicating hog lice. Extensive experiments were carried on with medicated hog wallows, and it was found that when properly constructed and used such wallows provide an effective and convenient means of treating hogs for lice and mange during hot weather.

CATTLE SCABIES.—Further experiments have confirmed former findings as to the efficacy of four dippings in lime-sulphur dip for the treatment of sarcoptic scabies of cattle. Farmers' Bulletin 1017 on cattle scab was issued.

SPINOSE EAR TICKS.—The pine-tar-cottonseed-oil remedy for ear ticks recommended in Farmers' Bulletin 980 is being used extensively in the Southwest with excellent results.

OTHER EXTERNAL PARASITES.—Experiments are in progress with reference to the relative value of different kinds of dips in protecting sheep from infection with scabies. Dips containing sulphur apparently protect a longer time than those not containing sulphur.

Herds of lousy cattle in different sections of the country have been examined at frequent intervals, and both biting and sucking lice have been found on some of the animals in each herd every month in the year. In summer they were found in small numbers, but they became more numerous and spread throughout the herd during the winter. The advisability of treating cattle for lice in the fall, before they go into winter quarters, even though they seem to be free from these parasites, is thus apparent.

ANTHELMINTICS AND TREATMENT FOR INTERNAL PARASITES.

Copper-sulphate solution was tested in the treatment of sheep for tapeworms and found only partly efficacious even when used in greater concentration than is used in the treatment for stomach worms.

In experiments to determine the most effective method of administering remedies to sheep with a view of promptly reaching the fourth stomach, better results were obtained with liquids than with pills or capsules. Apparently, however, there is not much uniformity in respect to the passage of the dose to the fourth stomach, though generally the dosing is more successful if the liquid is given slowly and with the sheep standing on all fours:

Experiments in the use of carbon bisulphid against bots in horses indicate that *Gastrophilus intestinalis* (*G. equi*) is more readily removed than *G. nasalis*, owing, presumably, to the location of many of the *G. nasalis* in the duodenum, and that 6 drams in a single dose is apparently the minimum amount that can be depended on to remove all the bots belonging to both species. It also appears that the administration of linseed oil in connection with doses of carbon bisulphid diminishes the efficacy of the latter drug against bots and ascarids.

MISCELLANEOUS INVESTIGATIONS ON ANIMAL PARASITES.

Investigations on the possible relation between swamp fever in horses and intestinal parasites have been carried on in cooperation with the Health of Animals Branch, Canadian Department of Agriculture. These investigations have as yet led to no definite conclusions and are still in progress. The investigations on the gape-worm of chickens have been continued.

Studies have been made of the effects of substances obtained from the tissues of *Ascaris*, *Ancylostoma*, sheep tapeworms, and other parasites upon the blood of various animals, and in some cases these substances have been found to have a hemolytic action; also in certain instances an agglutinating effect upon red blood corpuscles. It has also been determined that experimental animals in certain stages of trichinosis are highly sensitive to injections of blood serum from another trichinosis animal. Highly interesting results have been obtained in experiments with anaphylactic and precipitin reactions in which extracts of various species of parasites have been tested against one another. A preliminary report on the hemolytic action of *Ascaris* extracts has been published.

During the fiscal year 131 imported sheep dogs were examined for the presence of parasites transmissible to live stock. Of these 62 were free from intestinal parasites as determined by fecal examinations and 69 were infested. Twenty-two showed the presence of tapeworms and received anthelmintic treatment before release from quarantine. In one case the tapeworms expelled by treatment proved to be of the species known as the gid tapeworm. It is because of the danger of this tapeworm to livestock, especially sheep, that imported sheep dogs are subjected to quarantine. This is the first case of gid tapeworm that has been encountered since the inauguration of the quarantine, a number of years ago.

A study has been made of several species of flukes and the results prepared for publication. A comprehensive paper on the tapeworms of dogs and other carnivores, some of which are transmissible to human beings and live stock, has been published, also a report of observations on intestinal trichinæ. The portion of the Index-Catalogue of Medical and Veterinary Zoology relating to nematodes which has been prepared in cooperation with the Public Health Service is now being printed.

MISCELLANEOUS DIVISION.

The Miscellaneous Division, of which Dr. A. M. Farrington is chief, has continued its work relating to the personnel of the bureau and to veterinary education.

BUREAU PERSONNEL.

At the beginning of the fiscal year the persons in the employ of the bureau numbered 5,221. During the year there were 1,556 additions, made up as follows: Appointments, 1,458; transfers from other branches of the Government service, 16; reinstatements, 82. During the same period there were 1,956 separations from the service, as follows: Resignations, 1,087; deaths, 39; transfers to other bureaus or departments of the Government, 25; removals for cause, 8; all other separations, 797. This last item includes terminations of appointment by limitation or for administrative reasons, exclusive of separations for disciplinary reasons. At the end of the fiscal year the bureau personnel numbered 4,821, a decrease of 400 over the number at the beginning of the year. The unusually large number of resignations is accounted for by the fact that many of the veterinarians and lay inspectors resigned to accept other employment at higher salaries and that the special war work for stimulating agriculture was discontinued with the lapse of the special appropriation. The return of men who were in military service caused the bureau to terminate the appointments of many temporary employees. Because of the low salaries paid by the Government, the Civil Service Commission has not been able to supply a sufficient number of eligibles who will accept appointment. Nearly all the women who were employed to assist in meat-inspection work at the packing houses because men were not available have been replaced by men.

During the year nine civil-service examinations were requested and subjects and weights were furnished to the Civil Service Commission.

VETERINARY EDUCATION.

The regulations governing entrance to the examination for veterinary inspector were revised, effective September 5, 1918. The principal change consisted in raising the matriculation requirement to two years' high-school education of at least seven full units or their equivalent, instead of the former requirement of a first-grade civil-service examination, which is considered equivalent to a grammar-school education. The four-years' course of study is now in effect at all accredited veterinary colleges.

The Student Army Training Corps was inaugurated about October 1 at veterinary colleges as well as at other educational institutions, and applied principally to students who were high-school graduates. The War Department urged all veterinary students who were high-school graduates to attend State veterinary colleges. As many of these students had matriculated already at colleges where the session commenced about the middle of September, great confusion was caused by their transfer from one college to another. Following the armistice the corps was ordered disbanded the latter part of December, and still further confusion was caused by the return of many students to the colleges where they previously had matriculated. By reason of these disturbing elements the number of students in attendance at veterinary colleges was much less than

usual. The total number of freshmen enrolled in all veterinary colleges for the session beginning in the fall of 1918 was 264 against 338 for the preceding year. The combined attendance at all veterinary colleges was 1,114 against 1,841 for the former year. The number of graduates was 214 against 867 for the preceding year. Two of the five accredited agricultural colleges did not enroll any veterinary students, and the other three enrolled an aggregate of only 30. Because of war conditions which prevented it from procuring an adequate faculty, and the prospect of a small attendance of students, one veterinary college discontinued its sessions. One veterinary college in Canada was added to the accredited list. At the close of the fiscal year there were 17 accredited veterinary colleges in the United States and Canada and 8 in European countries.

OFFICE OF VIRUS-SERUM CONTROL.

The supervision of veterinary viruses, serums, antitoxins, etc., under the law of 1913, was continued by the Office of Virus-Serum Control, in charge of Dr. H. J. Shore until March 31, when he resigned, and since then the office has been in charge of Dr. D. I. Skidmore.

During the year licenses were issued to 84 firms for the preparation of 179 products for sale in interstate commerce, and 4 licenses were canceled.

Virus and serum for the prevention of hog cholera form a large part of the volume of products supervised. To determine the purity and potency of the serum and the freedom of the virus from contamination 8,480 tests of the former and 1,616 of the latter were made. The production was as follows: Serum, 673,297.647 cubic centimeters, of which 4,609,531 cubic centimeters was destroyed; virus for use simultaneously with serum, 19,963.053 cubic centimeters, of which 364,310 cubic centimeters was destroyed; virus for hyperimmunization of hogs for the production of serums, 181,750.862 cubic centimeters, of which 10,052.745 cubic centimeters was destroyed. The quantity of serum produced was very much larger than in any previous year. The demand for clear serum has increased greatly.

There were inspected and admitted to the premises of licensed establishments for use in the production and testing of antihog-cholera serum and hog-cholera virus 446,800 hogs and 3,400 calves, of which 1,187 hogs and 1 calf were rejected. In subsequent operations 25,585 additional hogs were rejected.

REPORT OF THE CHIEF OF THE BUREAU OF PLANT INDUSTRY.

WM. A. TAYLOR, *Chief of Bureau.*

AGRONOMIC AND HORTICULTURAL INVESTIGATIONS.

WHEAT.

The classification of American wheat varieties is progressing rapidly. Complete descriptions of about 135 commercially grown varieties have been given, and keys have been constructed by which

varieties may be classified and identified. This classification is being checked in the field again during the season of 1919 and will then be ready for publication.

In connection with the classification of wheats a very comprehensive varietal survey has been undertaken in cooperation with the Bureau of Crop Estimates. Schedules to determine the distribution of wheat varieties, the source from which they came, the date of their introduction into the community, and the percentage which each one represents of the total wheat acreage in the community have been sent out to some 65,000 crop reporters. The return schedules have been studied, and in thousands of cases letters of inquiry sent asking for additional information and for samples. For the first time in the history of wheat growing in America it will be possible to map the distribution of wheat varieties and to learn the large number of names under which the same varieties are known in different parts of the country.

In connection with the problem of the winterkilling of wheat it has been necessary to study the effect of different methods of seeding on the winter survival of the resulting plants. Preliminary cooperative experiments seem to indicate that drilling may be a factor in some sections. The geographic scope of these experiments is being broadened.

RICE.

A method of shocking rice developed cooperatively at the Crowley Rice Station in Louisiana proved its value again in the autumn of 1918. Wherever this method was used, comparatively little damage was done to the shocked grain by the heavy rains prevailing after harvest time.

Experiments to determine what crop may be grown profitably in rotation with rice in the Sacramento Valley again have resulted negatively. The data obtained indicate that cotton may become a commercial crop where the water table can be controlled and the crop planted early. A careful survey was made in portions of Georgia, Florida, and Alabama to determine what varieties and methods of growing will permit the production of rice without irrigation, in quantities sufficient for home use at least.

A general survey of Porto Rico was made in 1917 to determine the possibility of commercial rice growing on that island. This was followed by experiments undertaken cooperatively with the Porto Rico Experiment Station and with sugar planters at several points. This work is being continued during the crop season of 1919, and the results indicate that there is a promising outlook for commercial rice growing in Porto Rico. One variety produced a fair yield under conditions of drought so severe that the native varieties were a complete failure.

GRAIN SORGHUMS.

Long-continued experiments in the production and improvement of grain-sorghum varieties in the dry and elevated portions of the southern Great Plains area warrant the following conclusions concerning this group of grain crops so important in that section:

(1) Many varieties produce well in favorable seasons. Only well-adapted varieties produce well in the less favorable and in unfavorable seasons, which comprise about three-quarters of the total number.

(2) Earliness is the most important single factor in the varietal adaptation of grain-sorghum crops to the conditions obtaining on the high plains of the Texas Panhandle.

(3) Dwarfiness is the next most important factor in the adaptation of these crops.

(4) The combination of earliness and dwarfness is extremely efficient in insuring adaptation to environmental conditions which include frequent periods of drought.

(5) Dwarf milo, Dawn (dwarf) kafir, and Sunrise (early) kafir are shown to be well-adapted varieties.

(6) Dwarf milo and Dawn kafir are meeting with wide approval on the farms of the high, dry plains.

(7) Germination and stand are governed largely by local conditions at sowing time.

(8) Tillering, or the production of suckers, is a varietal or group character to some extent. In part, it is correlated with stand and seasonal conditions.

(9) The production of erect heads is largely a group or varietal character, but is influenced by the same factors as tillering.

BROOM CORN.

Experiments in the improvement and culture of broom corn have been conducted for several years at the Woodward Dry Land Field Station in western Oklahoma. The results indicate that in that district the crops should be sown in the first half of May or the last half of June. These seeding periods bring the crop into head either before or after the hot dry period which usually occurs about the middle of August. Spacing the rows 7 feet apart, with the plants twice as thick in the rows, gave no advantage over rows spaced 3.5 feet apart with the usual stand in the row. When harvesting is done while the seeds are in the dough stage, a higher yield and apparently a better quality of brush are obtained than when harvesting occurs at an earlier or later stage in the development of the plant.

PASTURE IMPROVEMENT.

The problem of improving pastures is becoming increasingly important, as the high prices of foods are more and more forcing attention to the only really cheap feed—pasturage. Confirmation of the bluegrass-pasture experiments, in which it was shown that heavy pasturing is much the best method, both agronomically and economically, has been secured by two investigators working on other pasture grasses. Better handling of northern pastures is a matter of great importance, but, unfortunately, available facilities for experiments and demonstrations are wholly inadequate.

On the coastal plains of the South, unless the soils are much affected by drought, carpet grass, supplemented with lespedeza, makes excellent pasture. As a rule, *Paspalum dilatatum* (golden crown grass) is also excellent. Efforts are being made, with the aid of a new stripping machine, to place carpet-grass seed on the market in adequate quantity. Several newly introduced grasses are promising as pasture possibilities, but the absence of any facilities for experimental trials makes progress very slow. The pasture problem on the Coastal Plain must be solved in order to bring about agricultural utilization of these lands at the present time.

RANGE IMPROVEMENT.

There is a constant demand for grasses that will increase the amount of feed on the semiarid range lands, over and above that

which may be secured by rational grazing of the land under fence. Sweet clover has proved very valuable, but much of the area is too dry for this plant. There is reason to believe that a systematic testing of the numerous grasses and legumes secured by botanical explorations in Central Asia will disclose species that will solve the problem.

VITICULTURAL INVESTIGATIONS.

The viticultural problem of the wine-grape districts of the Pacific coast from the production standpoint becomes one primarily of developing the Panariti and other currant grapes and the culture of the Ohanez and other late varieties, which it is believed can be produced advantageously in this country, with a view to their taking the place of the Almeria and other types of long-keeping grapes now imported into this country more or less from Spain and elsewhere. The results of investigations already in progress have seemingly demonstrated the practicability of growing these varieties on a commercial basis.

From the cultural standpoint, the use of cover crops in the Oakville Experiment Vineyard in California has demonstrated the importance of such crops in vineyard maintenance under such conditions as those obtaining there. The results from the experimental vineyards in California, which have been in progress for some 12 or 15 years, on resistant varieties, adaptability, congeniality, productiveness, etc., will serve as a basis for such modifications of the work as conditions may make necessary in the future.

The work with American bunch grapes has been confined chiefly to the use of fertilizers, pruning experiments, and other cultural features carried on in the experiment vineyard at Vineland, N. J. This vineyard has also served as a source of supply for raw material in connection with the fruit-utilization investigations, particularly in studying the value of different grape varieties for the making of unfermented juice.

The Muscadine grape investigations have continued to yield exceedingly important results. While the breeding investigations, which promise very much for this industry, were temporarily interrupted by war conditions, the work along other lines, particularly the utilization of Muscadine grapes, has been stressed both because of the relation of the utilization features to the food supply in the conservation of this fruit and the relation of this phase of the work to cultural problems. It has been determined that there is a pronounced difference in varieties in their value for the making of fresh juice and other products. The Thomas is the best of the varieties now commonly grown for unfermented juice, and it has high merit compared with other varieties for most other uses.

Under the cultural and particularly the pruning methods used in the experiment vineyard at the Pender Test Farm, Willard, N. C., excellent crops have been produced when, because of unfavorable climatic conditions, other vineyards and vines in the surrounding neighborhood have yielded little or no fruit.

SUBTROPICAL FRUITS.

The work with subtropical fruits has included studies of avocado varieties for Florida and citrus fruits for Florida, an investigation of the Satsuma orange varieties in the Gulf States, a study of avocado varieties for California, and the production of olives in California.

Of the avocado varieties in Florida the Trapp, which is the leading fall variety of the West Indian race, will probably be the one most commonly planted in protected localities for some years to come, as in the past. Of the Guatemalan varieties, which are thicker skinned and hardier than the West Indian avocado, the Fuerte, which has come to be one of the standard varieties of California, appears to be one of the best for conditions in Florida. It maintains there the same high oil content and other qualities that characterized it when grown in California.

Further work in California confirms the wisdom of the selections made by the California Avocado Association, announced in a circular published October 25, 1917, which recommends the Fuerte, Spinks, Blakeman, Lyon, Dickinson, Taft, Sharpless, and Puebla varieties. The Taft does not seem to be as hardy as many of the other varieties in the list, however, and for this reason it should be planted only in specially protected localities. Furthermore, it is a slow grower and the trees do not begin fruiting until they are 5 or 6 years old, which is at least two years later than most of the other recommended varieties. The Lyon does not make a very satisfactory growth except in the Montebello and Whittier districts. There is some question whether these two varieties should be retained in the list. The other six, however, appear to be specially well suited to California conditions. The Puebla is gaining in favor, and it will probably be extensively planted in the future.

A further study of Florida citrus varieties so far as they relate to oranges confirms the conviction, which is shared by officials of the Florida Agricultural Experiment Station, the State Plant Board, and a number of prominent nurserymen and growers, that the "accredited" list recommended by the Citrus Seminar in 1916 for planting in Florida should be continued. This list included, in the order of their maturity, the Parson (*Parson Brown*), Homosassa, Pineapple, Valencia, and Lue (*Lue Gim Gong*) varieties. Some growers and nurserymen believe that the Lue may be eliminated, as it resembles the Valencia in so many particulars.

Comprehensive investigations of the Satsuma orange industry in the Gulf States, and particularly in Alabama, have shown that there are at least three different varieties of these oranges being grown more or less extensively in this region and that the name Satsuma is, in fact, a group name rather than a variety name. This interpretation of the significance of this name explains many of the wide differences previously observed in the fruit grown and passing as "Satsuma oranges." The Satsuma varieties of principal importance are the Owari and Ikeda. The Zairai orange is found in a few orchards, but it is relatively unimportant except for the reason that, because of its unlikeness to other varieties, it may continue to create confusion if the fact that it does occur is not fully recognized.

In connection with the bud-selection work in California considerable attention has been given to the pruning of citrus trees. It is expected that the results of this work will be prepared at an early date for publication. The most striking features of these investigations have been what appears to be a clear-cut demonstration of the fact that the very heavy pruning practiced by some growers is

detrimental, but that a limited amount of pruning, wisely applied, is conducive to fruit production. Incident to the bud-selection work it appears evident that trees propagated from those having a high yielding record of desirable fruit require less pruning to keep them in good form and in good productive condition than do trees propagated according to ordinary nursery practices. The bud-selection work which has been in progress with citrus fruits in California for a number of years has been continued, though on a somewhat restricted scale.

From a practical commercial standpoint, the performance records of individual trees which have accumulated up to the present time are serving an exceedingly important purpose, in that they are used as a basis for choosing the trees selected as a source of bud wood by the California Fruit Growers' Exchange, through its bud-selection department. This department was organized for the purpose of furnishing buds cut from trees of known bearing habits to nurserymen or citrus growers who desired to use them for top-budding trees in their groves which were known to be relatively unproductive or which produced fruit of undesirable characteristics. The individual tree-performance records of the Ruby variety in a 10-acre orchard at Corona, Calif., have been continued, as during the two preceding years. The information thus obtained emphasizes the striking frequency of bud variation in this variety. This, in turn, emphasizes the importance of selecting buds for propagation not only from trees of known bearing proclivities, but even from limbs of known bearing proclivities, because trees are exceedingly common which in the main bear fruit of desirable type but have some limbs on which fruit that varies from the accepted standard is produced.

The records which are now being accumulated confirm more and more emphatically the previously drawn conclusion that the characteristics of the parent tree are perpetuated in the progeny with no important exception or variation. The progenies in experimental plantings are producing fruit comparable in every particular with that borne by the parent trees of large-yielding or other desirable characteristics, or, like the parent trees, they are barren or relatively barren.

In order that the standard strains of the different kinds and varieties which have been established may be fully maintained and the strains accurately recorded, additional descriptive notes and photographs of selected citrus trees and their fruits have been secured during the past year.

A large number of commercial citrus-performance records are being made, the interest of the growers having increased each year. The utility of these records is practical rather than scientific. They enable the grower to determine inferior trees for removal or top-working, as well as make possible the selection of superior trees from which buds for use in top-working may be obtained. It has been found that these commercial performance records can be made in Washington Navel and Valencia orange and in Marsh grapefruit orchards at an average cost of about \$1 an acre each year, while similar records in lemon groves cost about \$10, the difference being due to the greater number of pickings in the case of the lemons.

Considerable time has been devoted during the year to assisting growers in introducing individual-tree records and to the utilization of the data thus secured.

The progress of the bud-selection department of the California Fruit Growers' Exchange, which is the direct outgrowth of the work of the Bureau of Plant Industry, is of interest in the present connection particularly in view of the fact that more or less supervisory attention is being given to it. In the first year of this work, the representative of the exchange in charge of it handled a total of 260,000 citrus buds. These buds were sold to members of the exchange at the rate of 3 cents each and to nonmembers at 3½ cents each. Under these conditions the work was found to be self-supporting. The past year, owing to the increased knowledge that could be brought to bear in the work and the consequent better selection of bud wood, the price of buds was raised to 5 cents each to members of the exchange and 6 cents each to nonmembers. Under these conditions, the demand for buds has increased to such an extent that at the present time there is a greater demand for them than can be met. The citrus nurserymen who have used these buds have obtained better results from them than from the sucker-wood buds that were formerly used in propagation. Furthermore, it has become exceedingly difficult for nurserymen who do not use the selected buds in propagation to dispose of their stock when it is grown.

The work with olives has continued along the line of standardizing the varieties, of which there are apparently several being planted under the name "Mission." The varieties commonly planted have also been studied for the purpose of standardizing the product.

THE COMMERCIAL CULTURE OF SMYRNA FIGS.

The work on the life history and breeding of figs and caprifigs has been given a great impetus by the publication of a bulletin on the commercial culture of the Smyrna fig in this country.

The Smyrna fig industry is growing very rapidly in California, and thousands of acres are being planted every year. It is not improbable that this country will soon produce all the figs it needs.

Much of the success of Smyrna fig culture in California has been due to the fact that the United States Department of Agriculture has been able to maintain a caprifig orchard at Loomis, Calif., from which caprifigs have been distributed free to growers. Before this distribution was arranged for, many small growers of Smyrna figs became discouraged, and some even dug up their orchards. When Smyrna figs and caprifigs are planted together, the caprifigs do not bear enough fruits to properly caprify the crop until several years after the trees begin to bear. For this reason, a young orchard is dependent on importing the needed caprifigs during the first few years. It was to supply this need that a seedling fig orchard at Loomis was leased by the Bureau of Plant Industry and the general distribution of caprifigs to Smyrna fig growers arranged.

Many new varieties of caprifigs have been brought to light, some of them very important in commercial Smyrna fig culture. A number of strains of the Lob Ingir (the best type of Smyrna fig) have been found that seem to be immune to splitting and so appear very promising for commercial culture.

Many thousands of seedling figs have been distributed to cooperators in the fig-growing regions of California, Arizona, and Texas, and some promising new varieties have been originated by proper selection of male pollen.

In the fall of 1917 the fig insect was established in certain old seedling caprifig trees in Brunswick, Ga., and since then a number of other caprifig trees have been similarly treated. Thanks to this local supply of caprifigs, it has been possible to caprify and bring into fruiting many sterile seedling Smyrna fig trees growing in the Southeastern States. Some of these trees bear a very high grade of fruit, very promising for use as fresh fruit or for canning. It is still doubtful whether figs grown in the southeastern United States can be dried to advantage. At any rate, it is a matter of much interest and of some economic significance that many old sterile fig trees in this region are really Smyrna seedlings, approximately half being Smyrna trees and the others caprifig varieties.

COMMERCIAL DATE CULTURE.

Date culture, though still conducted on a small scale, is a recognized commercial fruit industry which gives promise of steady growth. The culture of the Deglet Noor, the finest of the imported date varieties, has already become well established in California.

At the present time American methods of date culture are probably more advanced than those of any other date-growing country in the world, in spite of the fact that our experience is limited to practically two decades.

NUT INVESTIGATIONS.

The work with nuts during the past year has been confined largely to pecans and has consisted for the most part in a continuation of studies previously inaugurated, including an investigation of the range of the species, the adaptability of varieties to different regions, methods of propagation, soil improvement, orchard management, and methods of harvesting, curing, packing, and handling the product.

From a continued study of varieties it appears that a considerable proportion of the varieties now being planted are so far below the general average of the best sorts in production and other important characteristics as to justify their elimination. It is becoming more and more evident that greater attention should be given to the matter of stocks for use in propagating pecans in the nursery.

A series of irrigation experiments begun during 1917 has been continued, although because of the rather heavy rainfall which has characterized the climatic conditions since the inauguration of these experiments there has been little opportunity to study the influence of the application of water during the dry periods which commonly occur and to which are attributed as a possible cause some of the adverse results experienced, such as the premature dropping of the nuts and other difficulties.

A series of fertilizer experiments begun in 1918 is being continued. Although the work is of too recent origin to report results, certain records suggest a slight increase in the yield of fertilized trees.

A further study of varieties is being made in the States bordering the area recognized as definitely within the pecan-growing territory. Planters in Oklahoma, Tennessee, Kentucky, Indiana, Ohio, Illinois, Missouri, and Kansas are becoming interested in the possibility of planting pecans and are seeking information with regard to varieties possessing the necessary qualities when grown under their conditions.

VEGETABLE STORAGE AND STORAGE LIFE FACTORS.

In cooperation with the Bureau of Markets, handling and life-history studies of tomatoes were carried on in Florida, particularly with a view to determining at what degree of ripeness tomatoes should be picked for shipment to northern markets in order that the best carrying qualities and the best dessert qualities might be realized. It was found, among other things, that the age of the tomato, that is, the time elapsing between the blossoming stage and the picking date, was of primary importance rather than the size of the fruits.

In the shipping tests with tomatoes it was determined that it was better not to wrap the individual fruits; the ripening process takes place better under full ventilation; if held under unventilated conditions offensive tastes and odors are likely to develop.

Freezing work on potatoes has been conducted, which is similar in character to the freezing work with relation to fruits, involving a determination of the temperature and the length of exposure to such temperature which will result in frost injury.

The behavior of celery, cauliflower, and lettuce when held in different storage temperatures has been critically studied. The practicability of storing these products on a very much more extensive scale than has been followed heretofore is indicated. Cauliflower, which as a rule has not been stored except for very brief periods, can apparently be held at a temperature of 32° F. for a period of 30 to 40 days.

A very limited amount of work has been done in the cold storage of flowers. The results secured in a preliminary way suggest the practicability of florists inaugurating very different methods of holding their flowers than those now in use wherever conditions may so suggest. Roses held at a temperature of 32° F. were in fair condition long after they would have completely deteriorated under the usual method of handling. Easter lilies after being stored for three weeks were removed in good condition and remained so for four days after being placed at common room temperature. Held for two weeks in storage Easter lilies stood up for five days in a warm room. Peonies and other flowers held up a surprisingly long time in a temperature of 32° F.

INVESTIGATIONS OF TRUCK-CROP PRODUCTION.

The work with sweet potatoes has been considerably enlarged both because of the need of fundamental information along certain lines and the importance of the crop in a large part of the country as a source of food. The work is carried on principally at Arlington Farm and at Florence, S. C., at the Pee Dee substation in connection with the South Carolina Agricultural Experiment Station. The work consists of a comprehensive study of varieties, for the purpose of working out a key by means of which varieties can be identified, and the varieties adapted to different regions and for such purposes as table use, stock feed, and as a possible source of sirup, sugar, and perhaps starch and other products, can be determined. Under the cultural and development phases of the work, investigations are being made in hill selection for the securing of seed stock, selections being made with regard to those having no string, those having a maxi-

imum number of strings, those having a maximum number of first-grade table potatoes, those having a maximum yield irrespective of size or shape, the latter having its particular application in the production of potatoes for stock feed and the making of sirup, sugar, starch, or alcohol, where a large yield is the primary feature. The object of the selections is self-evident, except that one where the selections are made with a view to producing the maximum number of strings; the importance of this is simply a matter of comparison and for securing a definite demonstration of the results in selection.

Investigational work in the curing of sweet potatoes was also carried on with very satisfactory results, it being shown that with proper handling and storage conditions sweet potatoes can be carried through the winter and as late as April 1 with not to exceed 1 per cent of loss from decay.

The work with peanuts has been along lines comparable with those followed in the sweet-potato work. Methods of planting, selection of seed, the improvement of yield, and cultivating and handling the crop have been studied. The study of varieties has made evident the fact that most of the so-called varieties now to be found in the trade are in fact merely old standard varieties with new or local names and that there are only about six distinct varieties grown in this country. Selected strains of some of these varieties are being made, with a view to producing those particularly adapted for definite purposes, such as the making of peanut oil a high-grade table and cooking oil, also employed in the manufacture of oleomargarine, and to some extent in making soap, etc., and also strains that are adapted for human food in the form of peanut meal, peanut butter, and other products. High-yielding strains are desirable for stock and dairy feeds.

IRISH POTATO INVESTIGATIONS.

The work under the Irish potato project previously inaugurated has been continued during the past year. These lines include a study and classification of varieties, a study of the adaptability of varieties to different conditions, selection studies in connection with the development of improved strains, a study of seedlings produced in breeding, studies of the best rate of seeding and of the use of whole or cut seed, and various other problems of a similar character.

In addition to these studies, all of which have been in progress for a number of years, attention was especially devoted to the development of improved seed stocks, it being realized that the seed stocks commonly available to potato growers contain many mixtures, not infrequently diseased and as a rule not as productive as they should be. It is a recognized fact that the yield of potatoes in this country is far below that secured in Germany and in some other countries. This difference is commonly attributed to the use of relatively inferior seed stock.

A collection of South American varieties of potatoes, including a number of the yellow-flesh types, has been grown for study each season for a number of years past. The full collection was grown in 1918, as it was the preceding year, at Swannanoa, N. C., and Presque Isle, Me., but without any very promising results, those obtained in 1918 being even less promising than were those in 1917. It now seems evident that, with the possible exception of two or three

varieties, this South American collection is without value for commercial purposes. The work with this group of potatoes will, therefore, be very much curtailed in the future.

The seed-improvement work is being carried on in cooperation with the agricultural experiment stations in practically all of the important potato-producing States. The best seed stock of the leading varieties in different regions is being grown in the different States. During the progress of the season the various plats are inspected several times for the purpose of eliminating diseased plants and those which are not true to name or true to type, and at the harvest period carefully studied selections are made for the purpose of obtaining the best strains of the different varieties. These potatoes in turn will be used for seed purposes with a view of developing stocks that are true to name, true to type, free from disease communicable through the seed and at the same time possess high-yielding proclivities.

VEGETABLE UTILIZATION WORK.

The investigations of the utilization of vegetables have been conducted primarily from the standpoint of the producer, with a view to securing information which will enable the farmer or the grower successfully and profitably to utilize his surplus crops or the crops which he may grow especially for drying or canning.

The activities have been directed toward the determination of varieties best adapted to the different purposes and to methods of procedure which will give a technique that the farmer can apply with reasonable assurance of the results.

In the canning of vegetables the fact has been developed that there is a very wide variation in the behavior of different varieties; for instance, certain varieties of beets appear to be much better adapted for canning than others. Methods of canning carried on with a view of determining processes which will give the greatest possible degree of success under the widest range of conditions are being investigated, it being recognized that most of the methods now used not infrequently give faulty results under many different conditions.

One of the most important activities has been directed toward the working out of satisfactory methods of canning sweet potatoes. The methods now used, both on the farm and by commercial canneries, result in a product which has a more or less burnt and otherwise unpleasant flavor. This burnt taste appears to be the result of caramelization. A method has been worked out whereby this is not only avoided but which results in a product that is essentially like the sweet potato when freshly prepared for table use. In the same connection canning tests of 34 different varieties of sweet potatoes have been made. These tests have shown a wide variation in the value of different varieties for these purposes. Other features of canning technique are being developed along the lines of the fundamental principles involved, which it is believed will have a far-reaching effect on farm canning.

BULB-CULTURE INVESTIGATIONS.

During the year one half of our bulb stocks have been removed to the new bulb farm at Bellingham. Owing to a shortage of labor the other half was left undug on rented ground. The total excess

production for the year was about 350,000 bulbs, or one minimum car-load, which supplied the entire quota of the congressional distribution. These stocks proved to be fully up to the standard. The narcissuses were especially commented upon as of superior quality. Of the minor lists of stocks not before handled, the Dutch irises, branching tulips, our native camassias, and some of the newer narcissuses have done especially well. The propagation of the lily is promising. Many species grow readily in this region by simply drilling the seed in open ground in autumn. Even such a species as *Lilium washingtonianum* is now promising under practically open-ground conditions, most of the plants not appearing above ground, however, until the second spring.

The preservation of bulbs taken out of beds after flowering has proved to be thoroughly practicable this season. Some 20 or more thousand tulips and narcissuses from the department grounds will give 80 per cent of flowering bulbs, besides an average increase of 160 per cent of small bulbs, which are just as good planting stock as can be secured anywhere. One year will bring the 80 per cent of flowering stock to first-class condition and half of the small stock to flowering size. This class of conservation is to be encouraged and no doubt will be practical now that bulbous stocks have doubled in price.

It has been demonstrated that the beautiful Palestine irises can be grown very satisfactorily in the Sacramento Valley, and probably in the other interior valleys of California. Our experiments show that a reproduction of 3½ fold may be expected the first two years after importation; also, what is known as the "Juno" group succeeds well here. In general, these groups, although in some respects the most attractive of the great iris family, have not been considered successful in this country up to this time.

The investigations of Easter lilies conducted at Arlington Farm, near Washington, have revealed a number of things of importance:

(1) Our seedling stocks after two years give a reproduction of bulblets which is ample for all purposes of propagation. This means that once a seedling strain has been developed a stock can be worked up very rapidly by vegetative methods, and these same methods will serve to continue the increase.

(2) Stem bulblets, which form in the axils of the leaves near the surface of the ground, are 6 to 12 in number under ordinary conditions, and several of them will give one, two, or three flowers the first year and grow to good flowering size with one year's cultivation.

(3) An increased bulblet propagation can be secured by plunging the pots, by hilling up around the plants, or by layering the stems.

(4) Seed dried for two or three months germinates in a shorter time than that which is sown immediately upon its maturity.

(5) Home-grown bulbs 3 to 6½ inches in circumference average three to five flowers to the stem when forced for Easter.

(6) A few flowers are secured in one year from seed.

(7) Seed sown in July, when carried on in pots, will produce bulbs which can be forced for the second Easter following.

(8) These facts enable growers to produce their own Easter lily bulbs from seed in one year's time, the seedlings being carried in pots. After flowering, the bulbs not disposed of can be carried out of doors south of Philadelphia and will be ready to force again after one year's recuperation.

(9) Stocks thus produced are free from disease.

CORN CULTURE.

Experiments have been conducted to demonstrate the practicability and value of the earlier planting of corn. Proof has been obtained that in many instances the earlier planting of large productive

varieties is much more profitable than the normal planting of early-maturing varieties. By much earlier than normal planting it has been found that larger growing varieties can be profitably grown for ensilage in northern localities and much better yields secured than by planting the smaller native varieties at the usual corn-planting date. In southern localities, by planting small short-season varieties earlier than normal much earlier maturity can be secured, thus affording a supply of corn for very early feeding. Many rather soft varieties produce sound corn when planted early in southern localities, but rot badly when planted late.

Investigations of cultural methods have shown that in localities where moisture is a limiting factor, the practice of planting in alternate rows short and long season varieties has increased yields as compared with either variety in pure plantings. It has also been observed that varieties differ in their ability to adapt themselves and their grain production to varying stands. When given increased spacing prolific varieties have shown ability to increase their grain production much more satisfactorily than have the single-ear varieties. This is an important factor in ordinary planting where missing places are frequent. In sections to which prolific varieties are adapted, they are more desirable than single-ear varieties because of their ability to make up by increased grain production deficiencies in stand.

Crossbreeding and experiments with unusual types of corn from different parts of the world promise interesting and profitable results.

Progress is being made in isolating uniform types within a variety. It has been found that so-called varieties of corn are largely conglomerates of many distinct types. In arriving at basic facts in breeding work it is necessary that these uniform types be segregated.

PLANT BREEDING.

WHEAT.

Wheat-breeding investigations in cooperation with the North Dakota Agricultural Experiment Station have resulted in the production of the Kota variety by selection from a mixture of Russian wheat. This is a hard red spring common wheat, both early and productive, with the additional valuable quality of high resistance to black stem rust. Preliminary milling experiments indicate that it is of good milling quality also. It will be increased for commercial growing and also will be used as a basis for further breeding.

Acme, a variety of durum wheat developed by selection from the Kubanka in cooperation with the South Dakota Experiment Station, is not only a high-yielding variety, but shows a high degree of resistance to black-stem rust. It has now been introduced into commercial cultivation in South Dakota.

In cooperation with the Cornell Agricultural Experiment Station in New York, there have been developed several superior wheat selections, both white kerneled and red kerneled. The work has progressed to the point where these selections are now being distributed to selected cooperating farmers in those sections of New York to which they are adapted.

Losses from the winterkilling of wheat have been very severe in different years, due apparently to several causes. Cooperative experiments in breeding wheat for winter hardiness have been established at the State experiment stations in Kansas and Minnesota. Already some promising winter-hardy strains have been assembled for use as a basis in breeding and studies of adaptation to severe conditions.

Very extensive studies of inheritance in wheat are being carried on at the Arlington Experiment Farm and at the Cornell Agricultural Experiment Station. Various characters of the wheat plant are being studied, including the inheritance of awns, color, and other characters of the glumes, color of grain, length of awns, straw characters, and various other characters that have a more or less economic importance. A very interesting feature of the work at the Cornell station is the synthetic production of a plant which is practically indetical with the wild emmer or so-called wild wheat of Palestine.

OATS.

In cooperation with the Iowa Agricultural Experiment Station, the oat variety Iowar has been produced by selection from the Sixty-Day variety. This is a high-yielding early strain of white oats, producing several bushels more per acre than ordinary varieties. It was first distributed to selected Iowa farmers in the spring of 1919, and about 250 acres were grown this season.

Extensive breeding operations for the improvement of oat varieties are being conducted in cooperation with the Cornell Agricultural Experiment Station. Several strains of high-yielding power for different districts in New York State have been developed and are now being grown by cooperating farmers in the districts to which they have been found adapted.

BARLEY.

Trebi, a 6-rowed barley, originated in cooperation with the Idaho Agricultural Experiment Station by selection from a mixture obtained in Asia Minor, has been found especially well adapted to conditions, both dry land and irrigated, in southern Idaho, where its commercial production was begun in 1918 and now totals about 3,000 acres.

The Sandrel variety, produced in cooperation with the Minnesota Agricultural Experiment Station by selection from a Californian barley obtained originally in Moravia, has given excellent results and has been distributed to agricultural experiment stations for further trial in order to determine its range of adaptability.

Barley breeding with definite reference to the inheritance of several important characters, such as awns, adherent hulls, color of kernels, and size and shape of embryo is under extensive investigation in cooperation with the agricultural experiment stations of Idaho and Minnesota.

VELVET BEANS.

The rapidly increasing importance of velvet beans in the South is perhaps the most striking agricultural phenomenon of recent years. It is due primarily to the development of new early-maturing varieties. A recently evolved variety, the Bush velvet bean, is entirely

nontwining in habit, thus paralleling a similar phenomenon which has before occurred in the garden bean, the Lima bean, the cowpea, the soy bean, and other annual beanlike plants. Of the numerous hybrids developed by the Bureau of Plant Industry one that has been called the Mississippi velvet bean is so promising that it is being propagated for general distribution.

SOY BEANS.

Interest has continued to increase throughout the country relative to the utilization of the soy bean, not only for forage purposes, but for oil and food products. The introduction of new varieties by the Bureau of Plant Industry has greatly extended the production area of the crop and therefore has brought about a greatly increased acreage, especially northward and westward.

The field work has been extended in testing out improved sorts in various sections of the country. A large amount of selection and hybridization work has been done, resulting in several quite promising sorts. Nearly all of the varieties now handled by growers and seedsmen were originated by the Department of Agriculture. During the past year the Mandarin has been introduced in the North as one of the most promising early-grain sorts. For the lands of the South infested with the wilt and nematodes the Laredo has been found highly resistant and is one of the most promising forage sorts.

The Biloxi, Virginia, Black Eyebrow, Man hu, and Wilson-Five varieties have been distributed over a wide territory and have given excellent results. The testing of varieties for food has determined that the Hahto for a green vegetable and the Easy Cook, a soft-boiling sort, as a dried bean are the best. The Hahto especially has been received with considerable favor. It has been widely distributed, several thousand packets being given to the boys' and girls' canning clubs of the South. In addition to developing forage and food value, breeding work has been conducted with varieties for high content of oil and protein.

TIMOTHY.

The new strains of timothy developed at Elyria, Ohio, at the forage-crop testing station, in cooperation with the Ohio Agricultural Experiment Station, still continue to prove superior to common commercial timothy in both pot and field tests. Investigations are now being carefully conducted with a view to solving some of the practical difficulties that lie in the way of establishing these strains in general use throughout the important timothy-growing sections of the country.

NEW CROP PLANTS AND CROP EXTENSION.

EGYPTIAN COTTON IN CALIFORNIA.

Many fields of Egyptian cotton were grown around Fresno and Bakersfield, Calif., in the San Joaquin Valley in 1918 and afforded striking demonstrations of the possibility of extensive production in this region. Not only were good yields obtained at the rate of a bale per acre, but the plants also showed an unusually regular and full development of the fruiting branches and bolls during the entire

season. Abortion of fruiting branches, buds, and bolls early in the season was much less common than in the Imperial and Salt River Valleys, and there was less injury from drought or other extreme conditions that often reduce the yields or impair the quality of the fiber in the southern valleys. In view of such differences of behavior there seems to be no ground for the fear that the growing season in the San Joaquin Valley may prove too short for Egyptian cotton.

WHEAT.

Early Baart, a hard white wheat, fields of which were surveyed in Arizona and California in 1918, was again grown on an increased scale in those States in 1919. Most of the expansion was based on seed from inspected fields. The results of this enlarged acreage are reported to be excellent.

The production of Dicklow, a white wheat of good quality, is being encouraged on the irrigated farms of the Snake River Basin in Idaho. A considerable extension of acreage took place in the spring of 1919, the total being about 8,000 acres, and excellent results are reported where sufficient irrigation water was available.

A selection of Dawson Golden Chaff wheat, resulting from cooperative experiments at the Cornell Agricultural Experiment Station, is now being distributed rather rapidly in New York State. The commercial fields of this variety are inspected each year in order that only pure seed of high quality may be used for the increasing acreage.

Kanred, a hard red winter variety, originated at the Kansas Agricultural Experiment Station, was inspected in commercial fields in Kansas in 1918, and some 400 fields of this variety were inspected by State officials in 1919. It is likely to become increasingly popular because of its resistance to leaf rust and stem rust, as well as because of its productiveness and high quality.

OATS.

The Albion and Richland, two superior early oat varieties, developed in cooperation with the Iowa Agricultural Experiment Station, are grown on an increasing acreage in Iowa and the adjacent States in the oat belt. The Albion (Iowa No. 103) is a selection from Sixty-Day. It is estimated that fully a million acres of it were grown in Iowa this year. The Richland (Iowa No. 105) is adapted to the more fertile alluvial soils, on which it yields about 4 bushels per acre more than the Kherson oat, from which it was developed. It is estimated that at least 50,000 acres were grown in Iowa in 1919.

Improved selections produced in cooperation with the Cornell Agricultural Experiment Station have been distributed commercially in cooperation with selected farmers, and their use is increasing in those sections of the State to which they are especially adapted.

BARLEY.

Owing to the decreasing demand for barley incident to the termination of the war and the advance of the prohibition movement, and owing further to the guaranteed price of wheat, it was feared that there might be a tendency to decrease the barley acreage in the

spring of 1919. Barley is a very important crop in the rotation in the States of the northern Mississippi Valley, as well as a very valuable crop for stock feeding. Active measures were taken in Wisconsin and Minnesota, especially, to emphasize the value of barley to the farmers of those States and thus encourage continued production.

RICE.

In California the commercial acreage of varieties introduced and improved by the Bureau of Plant Industry represented over 20 per cent of the total area of 106,220 acres in 1918. In 1919 this percentage is believed to be still larger.

GRAIN SORGHUMS.

Owing to the importance of the grain sorghums as drought-resistant crops, and in view of the long-continued droughts which have occurred in the western portions of Kansas, Oklahoma, and Texas during the past two or three years, another campaign was carried on in those States in the spring of 1919 to emphasize the value of these crops. The resulting acreage, while below that of 1918 because of the enormous increase in wheat, is slightly larger than that of 1917 and more than a million acres larger than that of 1916.

WINTER FLAX.

Under the supervision of a specialist, commercial sowings of winter flax were made for the first time in Arizona and southern California in February and March, 1919. These have now been inspected and harvested under supervision, and the seed either has been reserved for seeding an increased acreage next winter or arrangements have been made for shipping it to an oil mill, where its quality for oil production will be determined.

HARD FIBERS FOR BINDER TWINE AND CORDAGE.

The continued uncertainty of supply and the threatened shortage of henequen from Yucatan have caused serious anxiety lest there might not be enough binder twine to harvest the increasing crops of grain in this country. Investigations have been continued, therefore, with a view to finding new sources of supply or new regions where binder-twine fibers may be produced.

Field investigations have been conducted in southern Florida, Cuba, Haiti, Santo Domingo, Porto Rico, and the Virgin Islands.

HENEQUEN AND SISAL.—The conditions in extreme southern Florida and on the larger keys are regarded as suitable for the production of sisal and henequen fibers, provided the cost of land and of labor there is not too high to permit successful competition with other regions where these fibers are produced. A large commercial plantation is now being established by private capital in that region.

Henequen has been cultivated successfully for several years in Cuba, and the plantations are being increased there, but thus far they produce scarcely enough fiber to supply the cordage mills on that island.

In the Republics of Haiti and Santo Domingo it was found that most of the plants heretofore referred to as sisal or henequen were other species of agaves or furcraeas, which had been misidentified. Conditions are regarded as favorable for the production of binder-

twine fibers in limited areas in Haiti and over a much larger area in southern Santo Domingo. A small experimental planting of sisal has been made near La Romona, Santo Domingo.

In Porto Rico experimental plantings made in former years have resulted in the establishment of a commercial plantation near Yauco. Trial plantings of both sisal and henequen near Quebradillas, in northwestern Porto Rico, and on Mona Island, about 40 miles west of Mayaguez, are making a promising growth.

A fiber-cleaning machine of commercial type has been sent to the experiment station at Mayaguez, P. R., to demonstrate the production of henequen and sisal.

The development of improved strains of henequen and sisal by means of selections begun in 1917 at Mayaguez is being continued. Many of the second generation of suckers have been set out, and bulbils from the original selected plants which have sent up flower stalks are being grown in nurseries. The cultivation in several instances of bulbils and suckers from the same parent plant is expected to furnish more definite information than has been available heretofore regarding the relative merits of these two sources of propagating stock.

In the Virgin Islands excellent conditions for the cultivation of sisal, and probably henequen, are found on St. Croix, and there are now growing on that island sisal plants with leaves nearly 6 feet long that may furnish stock for starting a plantation.

In the Philippines the cooperation of the Bureau of Plant Industry with the Philippine Bureau of Agriculture in demonstrating the preparation of sisal fiber by means of modern fiber-cleaning machines has resulted in an increased planting of sisal on those islands and in the purchase and installation of machines by private capital to develop the sisal industry on a larger scale. The Philippine maguey plants are being replaced by sisal plants, which yield a fiber better adapted to the requirements of American manufacturers.

PHORMIUM, OR NEW ZEALAND HEMP.—The fact that phormium fiber may be used for binder twine and, furthermore, that this is the only cultivated hard-fiber plant which is grown in the Temperate Zone has led to an insistent demand for investigation to determine whether it may be grown profitably in the United States. The information obtained thus far shows that phormium is cultivated to only a very limited extent in New Zealand, most of the fiber being obtained from plants growing wild in reclaimed swamps. It has been introduced into nearly all warm or subtropical countries, but only on the island of St. Helena has the production of its fiber become an established industry, and in no place has it been found to grow in areas of commercial size as luxuriantly as it does in its native country. Several attempts by private individuals to cultivate phormium in this country have resulted in failure. These failures, however, together with the more successful growth of individual plants cultivated for ornament, have demonstrated that phormium requires a climate free from extremes of heat or cold, abundant moisture, and a fertile soil well supplied with humus.

Seeds of phormium have been secured from New Zealand, and young seedlings have been set out under conditions as nearly as may be found meeting the requirements of the plant.

YUCCA FIBERS.—An investigation has been made of the production of fiber from leaves of yucca plants growing abundantly over hundreds of square miles of unused lands from western Texas to southern California.

Fibers from palmilla (*Yucca elata*) in southern New Mexico and bear grass (*Yucca glauca*) in northeastern New Mexico and adjacent parts of Texas, Oklahoma, and Kansas have been used as emergency supplies to take the place of jute in the manufacture of cotton bagging.

Coarser fibers, more nearly like palma ixtle in character, are being prepared from the leaves of the blue yucca (*Yucca baccata*) of northern Arizona and eastern California, the green yucca (*Yucca mohavensis*), extending from the Mohave Desert of California to central Arizona, and the flowering yucca (*Hesperoyucca whipplei*), growing in the San Bernardino and Coast Range Mountains of California, to be used in the manufacture of binder twine.

The yucca plants now growing are sufficient to insure a supply of leaves for several years, but investigations are desired to determine the rapidity of growth, length of life, and the possibility of cultivating a permanent supply.

SOFT FIBERS FOR THREAD AND TWINE.

The severe reduction in foreign supplies of flax and hemp has resulted in increasing interest in the production of these fibers in the United States. The principal efforts of the Bureau of Plant Industry to encourage the cultivation of hemp and fiber flax in the United States have been directed toward the development of improved strains or varieties.

FLAX.—A large number of pedigree selections of fiber flax and also increase plats of the best varieties were grown at the experiment station at East Lansing, Mich., in 1918. These improved strains had been developed by four to eight generations of selection. A marked difference in resistance to lodging was shown by the different strains, and it was noted that some of the tallest and best strains were also lodge resistant.

In order to gain time in increasing the supply of seed of these improved strains some of the seed, after being harvested in Michigan, was taken to Porto Rico, where an increase crop was grown during the winter. The seed thus produced was brought back in the spring of 1919, in time for planting semicommercial tests in the fiber flax-growing regions in Michigan and Oregon. This flax is decidedly superior to the fiber flax grown from commercial seed of either recent or remote importation. The stocks of these improved strains are being increased as rapidly as possible.

Trial plats of fiber flax, ranging from one-tenth acre to 5 acres, are being grown in 12 localities in Wisconsin. Some of these plats are very promising, notwithstanding unfavorable weather conditions.

In addition to eastern Michigan and the Willamette Valley in Oregon, where the cultivation of fiber flax has become an established industry, this crop is being cultivated this season in western Washington, southeastern Minnesota, southern Wisconsin, and western

New York. The total area, about 5,000 acres, is slightly in excess of that of 1918.

HEMP.—The plats of pedigree seed hemp at the Arlington Farm made a record growth in 1918, two of the best varieties averaging 13 feet 5 inches and 12 feet 5 inches, respectively. More than 600 pounds of seed of these pedigree plants were sent out to commercial growers. Some of this was sown broadcast for fiber in order to compare it with commercial crops, but more than 300 acres were planted with this seed in checks for seed production, and this should yield enough for more than 4,000 acres of fiber hemp next year.

The second-generation hybrid Ferramington, combining the height and long internodes of Kymington with the earliness and heavy seed yield of Ferrara, gives promise of a good fiber type of hemp that may ripen seed as far north as Wisconsin.

A foreign market for American hemp is being developed, and for the first time in more than half a century commercial shipments of hemp grown in the United States are being sent to Europe.

Two important needs of the hemp industry in this country at the present time are an efficient system of water retting which will produce high-grade fiber like that imported from Italy and a satisfactory system of grading, so that both the producer and the manufacturer may know the quality of each bale of fiber.

FORAGE CROPS.

RHODE ISLAND BENT.

The preliminary tests of a new stripping machine to harvest the seed of Rhode Island bent were very satisfactory. Extensive tests will be conducted, and it is confidently believed that this machine will insure adequate market supplies of this seed, for which there is a large demand.

NAPIER GRASS.

Napier grass has created great enthusiasm equally in the extreme South and in California. In Florida it is more productive on sandy soils than any other grass yet found. The possibility of utilizing it as a pasture crop by grazing separate fields when the grass is 18 to 24 inches high is being tested; also the practicability of ensiling it when 6 to 8 feet high, two such crops being produced in a season. The mature stems are too fibrous to be satisfactory as feed.

SEEKING NEW CROP PLANTS ABROAD.

The search for new crops in foreign countries was continued during the year. This work was necessarily curtailed on account of war conditions. Explorations in Ecuador resulted in securing something like 50 new plant immigrants, among which are two avocados from a high altitude which may prove cold resistant. Through foreign correspondence something like 1,000 new plant immigrants were introduced. The search for new and promising crop plants was continued in a limited way in China and Japan.

NEW AVOCADOS FROM GUATEMALA.

Twenty-three new and promising avocados have been secured from Guatemala. More than 4,000 of these have been propagated, freed

from dangerous insects and diseases, and distributed for tests in Florida, California, Hawaii, Porto Rico, and Cuba. The varieties introduced should have a wide range, as they represent types coming from near sea level up to an altitude of more than 5,000 feet.

BAMBOO AS A CROP FOR THE SOUTH.

Sufficient progress has been made in the growing and testing of bamboos to show that we now have six or seven types suitable for a wide range of soil and climate and useful for a great variety of purposes. A type suitable to the warmer parts of the United States has been found useful in the manufacture of several kinds of brushes and brooms. A valuable edible type has been obtained and is being propagated. Two of the types adapted to a wide range of soil and climate have been found useful in the manufacture of fancy fishing poles and phonograph needles. Prior to the war, large importations of canes were made from the Orient for these purposes. The greatest use for the bamboo in the South will, it is believed, come from home utilization for water pipes, poultry-yard fences, poultry protection, light fences and gates, simple types of home furniture, outbuildings, etc. Bamboos are being propagated extensively with a view to inaugurating plantings and making tests through cooperation with boys' and girls' pig and poultry clubs in the South.

NEW OR RARE FORAGE CROPS.

Something like 1,200 bushels of new and rare soy-bean seed were grown for special distribution. The Hahto soy bean, introduced in 1915, has proved a most useful food and forage crop. An extensive distribution of this bean has been made in order that it may be given a thorough trial.

NEW STOCKS FOR AMERICAN FRUIT GROWERS.

One of the big problems of American fruit growing is that of stocks resistant to diseases and insects and suitable for our wide range of soil and climate. Promising new stocks of pear, apple, peach, cherry, and plum have been assembled from foreign countries, chiefly the Orient. Nearly 150 pounds of seed from pear trees supposed to be resistant to fire-blight have been secured through exploration in China. Seedling stocks are being grown at widely separated places, and distributions are being made to nurserymen and others in order to determine their disease resistance, congeniality, and adaptability to varying soils and climates. About 75,000 new pear stocks have been distributed.

BLIGHT-RESISTANT CHESTNUT TREES.

The Chinese chestnut (*Castanea mollissima*) has been found one of the most promising trees to combat disease. This chestnut was found in China, where for years the trees had to struggle against blight. Several thousands of these young trees are now being grown, also several thousand hybrid chestnuts, with the object of testing them for disease resistance and nut production.

PROMISING NEW VEGETABLE CROPS.

The dasheen continues to offer encouraging possibilities as a food crop for the South. Special attention was given to the marketing of this crop during the year. Nearly all the dasheens were marketed in northern and eastern cities, the price ranging from 12½ to 20 cents per pound. Seed tubers were supplied to about 1,700 collaborating experimenters. The production at one station on 3 acres was 850 bushels, or something over 50,000 pounds.

The chayote, another vegetable, gives promise of success. Nearly 750 bushels of this crop were produced at two stations, and 1,075 packages were sent to home demonstration agents in the South and to cooking schools. Something over 1,700 packages of seed chayotes were sent to persons in the South Atlantic and Gulf States who wish to grow the vegetable experimentally.

The arracacia, a staple vegetable of the Venezuelans, is another promising vegetable for the Southern States.

PROTECTING NEW PLANT INTRODUCTIONS.

So many dangerous and destructive crop enemies have been brought into this country that public sentiment has demanded more thorough protection. Very rigid protective measures have been adopted in connection with all plant-introduction work conducted by the Bureau of Plant Industry. Not only is every safeguard taken to prevent dangerous enemies from coming in on plant immigrants, but every precaution is observed in freeing our own seeds and plants which we send to foreign countries from many potential enemies that might be injurious in their new homes. Cooperating with the Federal Horticultural Board, intensive inspection is made of all seeds and plants coming from foreign countries and all seeds and plants distributed from our stations but originally coming from abroad. Between 3,500 and 4,000 lots of seeds and plants coming into the country and going out of the country were examined the past year. The increase in this work under the new Quarantine Order No. 37, issued by the Federal Horticultural Board, has made it necessary to broaden its scope. To this end a new plant-detention station is being established near the city of Washington. This station will have for its primary object the receiving and growing of new plant immigrants with a view to removing all possible chances of introducing dangerous diseases and insect enemies.

CROP UTILIZATION.**DRUG-PLANT INVESTIGATIONS.**

Notwithstanding the prevailing high market prices of crude botanical drugs, the period covered by the past fiscal year has been a critical one as affecting drug-plant culture in this country, because of shortage of labor and unexpected difficulties encountered by many who engaged in the enterprise without the experience or knowledge necessary to carry on the work successfully. The net result is seen in the abandonment of the work by a large number of the smaller growers, leaving the field to those who have been reasonably successful, either through favorable location or better equipment, from

the standpoint of facilities for handling special crops and business organization for marketing the products. The Bureau of Plant Industry has continued its efforts to assist both in the permanent development of this industry along practical lines and in saving waste and unproductive effort in directions likely to result in failure.

Continued interest is manifested in the development of drug gardens at schools of pharmacy throughout the country, and in a number of instances material assistance has been rendered in connection with the establishment of new gardens by furnishing plans, supplying seeds, roots, and plants for propagation, and giving desired information with respect to suitable selections for the available situation and general methods of culture and handling. This feature of the development of drug-plant culture affords improved facilities for instruction in the characteristics and properties of medicinal plants, and further is calculated to conserve propagating stock of important medicinal plants in this country and disseminate practical knowledge concerning drug-plant growing and handling.

THE CAMPHOR INDUSTRY.

The high price of camphor and the difficulty of obtaining adequate supplies from the native sources of production have greatly stimulated interest in the development of the camphor industry in Florida. Through an informal cooperation with the large camphor growers systematic observations have been continued on improved methods of growing and handling the crop in the field. An intensive study of the process of distillation revealed sources of loss, and refinements in the methods of recovery were devised by which the percentage of camphor recovered from the distilled material is very substantially increased. Extended experimentation on methods of propagating and transplanting camphor seedlings has resulted in a substantial reduction in the cost of these operations on a large acreage basis.

UTILIZATION OF AGRICULTURAL WASTE PRODUCTS.

Studies of waste materials of the canning and fruit-packing industries have been continued with reference to the economic possibilities in the recovery of valuable commercial products from these sources. Investigations of the utilization of tomato-cannery waste on a commercial scale have been brought to satisfactory completion. Similar studies during the year have included the investigation of the possibilities in the utilization of waste grape pomace, pumpkin seed, and corn waste from canneries, and the sirup content of the stalks remaining after the harvest of sweet corn.

CROP UTILIZATION IN IRRIGATED REGIONS.

In newly developed irrigated regions there is a continuing and urgent demand for information as to the best varieties of field crops for each locality and the best methods of culture, as well as of methods of crop utilization.

The economic importance of utilizing bulky forage crops at the point of production through the use of live stock has been fully recognized, and arrangements have been made for demonstrating at the irrigated field stations the most efficient methods of using such crops. Extensive demonstrations have been carried on in pasturing

crops, the production of silage crops, the utilization of by-products, and in supplementing pasture crops with grain for the production of meat and milk. Some attention has also been given to the use of sheep on irrigated farms, and some of the possibilities of using these animals for consuming waste products and cleaning up fields and ditch banks have been demonstrated.

INVESTIGATIONS OF SEED SUPPLIES.

ENFORCEMENT OF THE SEED-IMPORTATION ACT.

During the past year comparatively few lots of seed have been offered for entry which did not comply with the requirements of the Seed-Importation Act. The most striking exceptions have been certain lots of Canadian alsike-clover screenings which have been imported for the purpose of recleaning.

Of those seeds covered by the act the importations during the fiscal year 1919 have been few as compared with 1917 and the preceding year, with the exception of alsike clover, of which 7 million pounds were imported, as compared with $3\frac{1}{2}$ million pounds last year and $4\frac{1}{4}$ million pounds the previous year, these three years being those of largest importation of this kind of seed. It is evident that practically this entire quantity of alsike-clover seed was put into consumption, so there will be little, if any, carry-over of the seed imported during the fiscal year.

There was a remarkable falling off in the quantity of rapeseed imported—639,000 pounds this year as compared with more than $11\frac{1}{4}$ million pounds last year, both years' importations coming principally from Japan.

SEED TESTING.

During the year, 18,820 samples of seed were received for test at the Washington laboratory and 10,252 at the five branch laboratories maintained in cooperation with State institutions.

LABELING FIELD SEEDS.

Following a conference with seedsmen in the summer of 1917, representatives of the seed-trade associations and a large number of individual seedsmen agreed to label all lots of field and forage-crop seeds sold in quantities of 10 pounds or more with the percentage of pure live seed, the date of the germination test, and in certain cases the country of origin. In the spring of 1918, seeds of redtop and red clover were purchased and examined to determine to what extent this agreement was kept. This examination showed that only 10 per cent of the lots of seeds purchased were found to be fully labeled in accordance with the agreement.

Practically all of the larger seed dealers now have facilities for testing seeds and know the quality of the seeds they are handling, but apparently most of them are not passing on to the farmer this information, which is of vital importance to him.

CRIMSON CLOVER.

A series of trials designed to be carried on for five years has been begun to determine whether French or domestic crimson-clover seed is best for this country. These trials are being made in coopera-

tion with the Delaware and North Carolina agricultural experiment stations. The seed used comes from France, Italy, Delaware, and Tennessee.

In connection with the development of the crimson-clover seed-growing industry in south-central Tennessee, a preliminary study has been made of the problems and it has been found that harvesting is the most important one connected with this project. The tendency of the growers is to harvest a little too early, so as to prevent loss by shattering. This results in harvesting a great deal of shrunken immature seed. Work must be done to determine whether harvesters can be used that will permit the clover to stand until thoroughly mature.

COTTON.

The selection and the distribution of superior varieties of cotton are being continued, with special attention to the problem of developing and maintaining adequate supplies of pure seed in order to extend the commercial production of these varieties in the different regions of the cotton belt. The largest volume of production has been attained with the Lone Star variety, now estimated at above 1,000,000 acres. This variety represents the Texas Big-Boll type, having the good qualities of Triumph and Rowden with larger bolls and lint of better quality, that under normal market conditions commands a distinct premium over ordinary short cotton. The Lone Star variety has been distributed eastward from Texas, with the advance of the boll weevil, and has become popular in many Upland districts. An organized production of larger quantities of pure Lone Star seed is being developed in northern Texas, with a cotton-breeding station at Greenville, Hunt County, serving as a center for cooperation with local communities.

The Trice cotton has become widely known, being an extra-early variety, unusually productive, and having larger bolls and better lint than other short-season kinds. It is grown especially along the northern rim of the cotton belt. For dry weather and short-season conditions in Oklahoma and Texas a variety recently acclimatized from southern Mexico is being grown extensively under the name of Acala.

Several long-staple Upland varieties have been bred or acclimatized and distributed by the Bureau of Plant Industry and grown in commercial quantities, the Columbia (or Webber) in South Carolina and adjacent States, the Foster in Louisiana and the Red River Valley of Texas, and the Durango in the Imperial Valley of California, the Pecos Valley of New Mexico and Texas, and also in Alabama and South Carolina and in southeastern Virginia. Another new type called Kekchi, introduced from Guatemala several years ago but not yet distributed, has attained local popularity in northern Texas, around Clarksville.

Between two and three thousand acres of Meade cotton are being grown this season in the Sea Island district of Georgia and Florida. This variety seems likely to replace entirely the mainland crop of Sea Island cotton as soon as the seed can be multiplied in sufficient quantity. The production of pure Meade seed is still inadequate to meet the demands, since it has been demonstrated that the variety

is not only as early as most of the short-staple varieties, but yields well and produces a fiber that is received on the markets on a par with Sea Island cotton; in fact, many bales of Meade have commanded a premium over Sea Island. The supply of pure seed for planting purposes is being rapidly increased, due to the cooperation of many growers who have appreciated the necessity for isolation and clean ginning. It has been found, however, that many growers and ginners do not appreciate the necessity for pure seed, and quantities of mixed seed have been sold and planted. Should this process continue, the reputation of the Meade variety for uniformity may suffer on account of the distribution of these mixed stocks. An organization of Meade growers in cooperation with the Bureau of Plant Industry is endeavoring to have all mixed stocks replaced with pure seed, and with a definite recognition of the need of continued selection and isolation to maintain the purity and uniformity of the stock it is hoped that the necessary precautions may be taken.

The most striking example of introducing a new type of cotton, establishing a new industry, and maintaining an adequate supply of good seed is in connection with the Pima variety of Egyptian cotton in the Salt River Valley of Arizona. Nearly 100,000 acres of pure Pima cotton were planted in the spring of 1919 in the irrigated districts of the Southwestern States. This scale of production of superior fiber has become possible through the establishment of a central supply of pure seed, 1,250 tons being furnished for planting in 1919 from a single community center around Tempe, Ariz., where no other variety is grown.

Cooperation with the Pima cotton growers in maintaining the purity of their planting seed was continued by roguing the seed-increase fields and removing the off-type plants. This work gives an exceptional opportunity for thorough study of the commercial seed stock of this variety and for detecting the first indication of deterioration, if this should occur. No evidence has yet been obtained of any loss of uniformity in this variety. The measures taken by the Bureau of Plant Industry, ably seconded by a growers' association in the Salt River Valley, have successfully protected this exceptionally uniform cotton from mixing or crossing with any other variety.

Pima cotton is now the only very long staple variety (with fiber $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long) grown in the United States of which a large supply of even-running fiber is obtainable. Approximately 35,000 bales were produced in Arizona and California in the calendar year 1918. The demand for this variety since Sea Island cotton production has been curtailed by the boll weevil has exceeded the supply. This cotton is most extensively used in high-grade automobile-tire fabrics and appears to be a satisfactory substitute for Sea Island in most goods for which that cotton is used.

A serious problem of cotton farming in dry regions or where dry weather occurs at the planting season is to obtain regular germination of seed and a full stand of plants in the rows. Germination may be prevented by dry soil or by planting too deep. Experiments conducted in Arizona and Texas have shown that much better stands can be secured by a lister attached to the shoe of the planter, which makes it possible to place the seed in moist soil at a uniform depth.

CONGRESSIONAL SEED DISTRIBUTION.

During the fiscal year 1919 there were distributed on congressional and miscellaneous requests 8,072,791 packages of vegetable seed, and 883,136 packages of flower seed, or a total of 8,955,927 packages, each containing five packets of different kinds of seed. There were also distributed 12,122 packages of lawn-grass seed, and 10,368 packages of imported narcissus and tulip bulbs. The seeds and bulbs were purchased on competitive bids, as heretofore. Each lot of seed purchased was thoroughly tested for purity and viability before acceptance by the Bureau of Plant Industry, and tests of each lot of seed were conducted on the trial grounds of the Department of Agriculture to determine its trueness to type.

NEW AND RARE FIELD-SEED DISTRIBUTION.

A distribution of new and rare field seeds was made throughout the entire United States, having for its object the dissemination of seed of new and rare field crops, seed of improved strains of staple crops, and high-grade seed of crops new to sections where the data of the Department of Agriculture indicate such crops to be of considerable promise. Each package contained a sufficient quantity of seed for a satisfactory field trial, and the recipient was urged to use the seed, if feasible, for the production of stocks for future plantings. A report card and a circular giving full directions for the culture of the crop accompanied each package of seed.

Only seed of new crops or of improved strains of standard crops were distributed, including the following: Dakota-grown, Grimm, Kansas-grown, and Peruvian alfalfas; Great Northern field beans; yellow and white sweet clovers; Brabham, Groit, and Early Buff cowpeas; feterita; Bangalia, Carleton, Gregory, and Paragon field peas; Natal grass, orchard grass, and Rhodes grass; Dwarf Black-hull kafir; Turkestan, Golden, and Kursk millet; Dwarf Yellow milo; Freed, Dakota Amber, Red Amber, and Sumac sorghums; Biloxi, Black Eyebrow, Haberlandt, Ito San, Mammoth Yellow, Manchu, Peking, Tokyo, Virginia, Wilson, and Wilson-Five varieties of soy beans; Sudan grass; Alabama, Bush, Georgia, and Osceola velvet beans; purple, narrow-leaved, and woolly-podded vetch; and the Acala, Columbia, Dixie, Durango, Holdon, Lone Star, Meade, and Trice varieties of cotton.

During the year 139,441 packages of new and rare forage-crop seeds and 30,701 packages of cotton seed, or a total of 220,142 packages, were distributed. Gratifying results were obtained, indicating that by enabling a farmer to procure seed of new and improved crops in sufficient quantity to produce stocks for future seeding the crops of the country are gradually improved.

SOIL-FERTILITY INVESTIGATIONS.

FERTILIZER STUDIES IN THE FIELD.

Field studies have been continued and much extended during the year, and the results obtained have been particularly timely, in view of the fact that the war has upset the normal fertilizer composition and practice with regard both to nitrogen carriers and to potash

carriers. Field experiments have been conducted on the Washburn and Caribou silt loam in Maine; on the Sassafras silt loam on Long Island and in New Jersey; on the Penn loam in New Jersey; on the Hagerstown loam in Pennsylvania; on the Norfolk fine sandy loam in Virginia, North Carolina, South Carolina, and Florida; on the Norfolk sandy loam in Florida and the Norfolk coarse sandy loam in South Carolina; on the Portsmouth sandy loam in South Carolina; on the Coxville fine sandy loam in South Carolina; on the Orangeburg sandy loam in Georgia; on the Pope fine sandy loam in Arkansas; on the Greenville sandy loam in Georgia; on the Susquehanna fine sandy loam in Georgia; on the Scottsburg sandy loam in Indiana; and on the Superior silty clay loam at Ashland, Wis.

In the plan of experimentation followed there are being determined the best ratios of the plant-food constituents in the fertilizer mixture suited to the respective soils, the amount of these fertilizers giving the most profitable returns, and the availability of the various carriers for phosphate, potash, and nitrogen in the fertilizing materials commonly employed, as well as those which have been introduced during the war.

The American sources of potash studied are the salts from the Nebraska lakes, which are principally carbonates; the salts from the California borax lakes, which are principally muriates; the product from alunite mined in Utah, which is a high-grade sulphate of potash; ground kelp from the Pacific coast, tobacco stems, beet-waste potash, and several potash materials collected as dust from the cement mills. The sources of nitrogen studied are sodium nitrate, ammonium sulphate, dried blood, cottonseed meal, and cyanamid, a nitrogen-fixation product now used in fertilizers. The experiments are showing that these different materials have different economic importance, depending upon the soil and crop.

The crops grown in these fertilizer tests are those of greatest interest or economic importance to the region studied and include potatoes, cotton, corn, citrus fruits, pecans, sorghum, clover, celery, etc. These experiments are carried on cooperatively with the State agricultural experiment stations and other local associations and also with various offices of the department. The results obtained are being collected for a comprehensive study of these different soil types, but they are already yielding valuable results for local application as to the fertilizers best suited for particular regions and are also furnishing information to the farmers as to the various nitrogen and potash carriers most likely to produce the best returns in practice.

STUDIES OF THE MALNUTRITION OF CROP PLANTS.

The study of the malnutrition of certain plants, most notably of potato and cotton, which became particularly emphasized during the war, has been continued, and further facts regarding the distribution of these diseases and their relation to soil types, systems of agricultural practice, and fertilizers used have been determined. New and untried fertilizing materials are sometimes responsible for these troubles, but more often they have been due to an unbalanced condition in the fertilizers, due to too great an increase in one of the ingredients, with often total elimination of another. This in some regions has produced the so-called potash hunger of the potato plant,

to which considerable loss in the crop along the Atlantic coast can be ascribed. This unbalanced condition of the fertilizer shows itself most markedly on the low-lying soil regions of the East and on the sandier types of soil. A similar condition has shown itself along the Atlantic seaboard with the so-called cotton rust, which is a malnutrition disturbance caused by an unbalanced condition of the fertilizer used or by the unbalanced condition of the normal soil nutrient solution as found in many of the sandier soils of the Coastal Plain. The experiments show quite definitely that this condition is associated with the fertilizer practice and that potash salts will correct this difficulty and prevent the collapse of the plant.

To a certain extent last season and quite prominently this spring some further difficulties in fertilizer usage have arisen in connection with the reappearance of higher potash contents in fertilizers. This subject has been under investigation in connection with our tests on various potash sources now used in fertilizer practice, and the difficulty referred to appears to be due to a disturbance of the normal growth of the plants by the presence of borax in the potash-carrying fertilizers. Such fertilizers, it would seem, should be used only under such restrictions as will make it certain that harmful quantities of borax will not be introduced into the soil. The loss from this fertilizer disturbance this year is estimated to be considerable, especially when large quantities of a potash fertilizer are used, particularly with potatoes, cotton, and tobacco.

FERTILIZER TESTS OF UNUSUAL MATERIALS.

The war conditions have brought forth a very considerable number of substitutes for the usual and normal fertilizer ingredients, some of which are in the hands of various strongly organized concerns, but which are nevertheless of doubtful value. Quite a number of these products have been tested, both in the greenhouse and in the field, where either their worthless character or their proper value has been shown.

BIOCHEMICAL INVESTIGATIONS.

Scientific inquiries into the fundamental factors underlying soil fertility and plant nutrition have been continued and with the cessation of war work have developed at an increasing rate. Among these is the relation of certain plant diseases to the hydrogen-ion concentration of the soil; the study of the chlorophyll changes which occur in the case of malnutrition of the potato and cotton plants; the causes of certain chlorosis phenomena in plants under adverse soil conditions; the relationship of the composition of the crop to the fertilizers used; and the relationship of the soil in general to the prevalence of plant diseases and the physiological condition of the crop. There is in process also a study of the composition of the plant in certain constituents, such as proteins, carbohydrates, and fats, in relation to the fertilizer used.

UTILIZATION OF EXCESS WAR MATERIALS FOR FERTILIZER.

Since the close of the war an investigation into the use of deteriorated cannon powder and smokeless powder has been begun at the request of the War Department and in cooperation with the National

Research Council, with a view to utilizing economically such materials in fertilizer practice.

The investigation has already shown that trinitrotoluene is poisonous to plants and can not be directly used in fertilizers; that the nitrated celluloses, while not poisonous to plants, are, on the other hand, so insoluble as to leave the nitrogen unavailable to plants, and that ammonification or nitrification of this material in the soil proceeds with extreme slowness, if at all, under normal conditions. Chemical treatment of this material is therefore being resorted to, and already some very promising results have been obtained, which make the nitrogen of such materials available and would appear to be the basis for the possible utilization of such material in fertilizers.

FERTILIZER TESTS ON TOBACCO.

In Maryland a series of fertilizer tests with tobacco which has been in progress for several years was completed, and the results have been published in popular form. It has been found that on the average soil nitrogen is the fertilizer element most needed by the tobacco crop. Phosphoric acid has not increased the yield, but may improve the quality of the tobacco. Under systems of heavy or continuous cropping the tobacco has shown a decided need of potash. Under average conditions a fertilizer supplying 25 to 30 pounds each of nitrogen and potash and about 50 pounds of phosphoric acid per acre will give very profitable returns. The commercial fertilizers commonly used by tobacco growers do not furnish enough nitrogen for the best results. Field tests dealing with the fertilizer requirements of the principal types of tobacco were continued in the States of New York, Pennsylvania, West Virginia, Virginia, and the Carolinas.

Substantial progress has been made in an investigation of the rôle of potash in the nutrition of the tobacco plant, including the comparative effects of the muriate and sulphate on the growth and development of the plant. It has been established that there are material differences in the action of these two forms of potash when applied as a fertilizer to tobacco on certain types of soil.

PLANT-NUTRITION INVESTIGATIONS.

In the field experiments dealing with the specific effects of crop plants on the yields of crops immediately following, many data have been secured tending to show that under strictly comparable conditions corn, tobacco, and potatoes affect very differently the yields of succeeding crops of wheat, oats, and rye. These effects are manifested under different fertilizer treatments, but in varying degrees. The crops of corn, tobacco, and potatoes also show similar results when each crop is grown after itself and in rotation with the other two.

In connection with further investigations on the relation of the environmental conditions to the formation of oil in the seeds of plants it has been discovered that, contrary to general belief, sunlight, rather than temperature relations, is the important factor in determining the seasonal development or maturation of plants. This discovery of a comparatively simple connection between sunlight and the vegetative and reproductive phases of plant development un-

doubtedly will throw much light on the relationships between early and late maturing varieties and species and their natural distribution.

PLANT PHYSIOLOGICAL INVESTIGATIONS.

Evidence has accumulated that a low water requirement, although an important factor in comparative resistance to drought, is by no means the only factor involved. The water requirement has now been determined for practically all important species and varieties of field crops, and the data obtained during the past several years make it possible to answer decisively the question to what degree water requirement is correlated with adaptability to drought conditions. Attention was focused during the past year upon the increase and distribution, in cooperation with the congressional seed distribution, of improved strains of sorgo and millet adapted to conditions in the northern Great Plains region. Drought-resistance breeding work with other forage plants, especially alfalfa and smooth brome-grass, was continued, and promising strains of the two crops mentioned are being increased for distribution to farmers in the central and northern Great Plains.

CEREAL PATHOLOGY.

BLACK OR STEM RUST.

BLACK-RUST EPIDEMICS.—An intensive nation-wide investigation of black rust has been made during the year. Special attention has been given to the factors which may contribute to epidemics of this rust. Among these factors are weather conditions, soil drainage, air drainage, barberry bushes, the winter hardiness of the urediniospores, or red stage, and of the teliospores, or black stage, and the carrying of spores by the wind.

In the investigation of the overwintering of the black rust it has been found that survival varies with the severity of the winter. In average years very few of the red spores, which start the rust directly on wheat in the spring, are able to survive winter conditions north of about latitude 35° N. South of this general latitude, however, they were able to overwinter abundantly. In the exceptionally mild winter of 1918-19 they survived as far north as Wisconsin. On the other hand, the black spores, which start the rust on barberry bushes, normally live through even the severe winters of our most northern States and start the rust in the spring. They can not start the rust directly on wheat, however, so that destroying common barberries makes these spores harmless. A thorough investigation of the infection of wheat seed by black rust has been completed. The study has covered several years and involved the growing of many thousands of plants from rust-infected seed; no infection of seedlings from such infected seed has been produced.

Varieties of wheat almost completely resistant to some of the biological forms of black rust have been discovered or developed by breeding and are being used in other breeding experiments in cooperation with the agricultural experiment stations of Minnesota and Kansas.

BARBERRY ERADICATION.—The campaign for the control of the black rust of wheat through the eradication of the common barberry is in

active operation in thirteen North-Central States, namely, Colorado, Illinois, Indiana, Iowa, Michigan, Minnesota, Montana, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin, and Wyoming. State laws requiring the removal of common barberry bushes have been enacted in all these States except Indiana, Ohio, and Wyoming. The campaign has been conducted in each State by widespread publicity through many channels.

The first problem, naturally, is to locate all bushes resulting from intentional planting and induce their owners to remove them.

The second, and perhaps the most difficult problem in the campaign, is to locate bushes running wild. The number of localities in which wild bushes are found is immensely larger than was believed at the beginning of the campaign. Through many decades since barberries were first planted in these States, the seeds have been sown in large numbers in thickets and woodlands by wild birds. The difficulty of locating such bushes in rough and broken timberland, oftentimes amid thickets and underbrush, will be appreciated by anyone who undertakes it. It is essential, however, that such bushes be located and removed. In most cases they are not far distant from grainfields, and in any case rust spreads readily from them to grainfields by way of wild grasses in their vicinity. Furthermore, if they remain undisturbed their numbers will continue to increase by the action of birds throughout the years to come.

The third problem is to insure that every bush located is removed by the owner or agent, and so thoroughly and completely removed that sprouts will not develop, or, failing this, to insure that sprouts which do appear will be destroyed.

Already the number of bushes located and destroyed runs into the millions. More than half a million have been destroyed by nurserymen in a single State. Naturally, as the campaign progresses the number of bushes located each month becomes smaller. However, they are still being found by the tens and hundreds of thousands. From March to July, 1919, inclusive, more than 16,000 bushes were located in Illinois. Nearly 40,000 were located in Iowa during the spring and early summer of this year. Up to May 30, 1919, Nebraska had found 63,000 bushes. About 91,000 plants have been removed from private premises in Wisconsin, in addition to large numbers taken out of public grounds. No serious outbreak of black stem rust occurred this season, although many bushes undoubtedly remain undiscovered.

LEAF RUSTS OF WHEAT, BARLEY, AND RYE.

A leaf-rust survey and investigation of epidemiology have shown the leaf rusts, and particularly the leaf rust of wheat, to be of far greater importance as limiting factors in grain production than had been supposed. In some sections of the South Atlantic coast the damage due to the leaf rust of wheat was so serious as to ruin the crop. In the States growing hard winter wheats extensively, such as Kansas, Nebraska, and Oklahoma, leaf rust was almost epidemic this season.

Field, greenhouse, and laboratory investigations of the leaf rusts of wheat, barley, and rye have been carried on in cooperation with

the Indiana Agricultural Experiment Station. Special studies to discover biologic forms of leaf rusts have so far given negative results. Considerable progress has been made in determining the hosts and host relationships of the several leaf rusts, and many data have been obtained on factors influencing the development of epidemics. Investigations have shown that the leaf rusts of wheat and rye can overwinter in the urediniospore stage, even in the severe northern winters.

One of the most important discoveries in the history of rust investigations in this country has been made in cooperation with the Agricultural Experiment Station of Kansas. The three Kansas wheat selections of the Crimean group—Kanred (P-726), P-1066, and P 1068—which previously were known to be resistant to the most seriously destructive biologic form of black rust, here proved to be highly resistant also to leaf rust.

FUSARIUM ROTS OF CORN AND THE SCAB OF WHEAT AND OTHER CEREALS.

Investigations show that the *Fusarium* rots of corn live through the winter both in the soil and in and on the seed. They attack the corn crop at several different stages and in several different ways, as follows: (1) By preventing germination in laboratory and field; (2) by causing a weak germination in the germinator and in the field; (3) by blighting and destroying the seedlings; (4) by dwarfing the seedlings so much that they develop only barren stalks or stalks with small and sometimes almost worthless ears; and (5) by rotting the root systems, or the stalks and ear shanks, resulting in stalks easily blown over by wind, in broken stalks, broken ear shanks, and the rotting of the ears themselves in varying degree. Some of the diseased plants ripen prematurely. Because of this early ripening, the ears from such plants frequently are selected for seed. Diseased stalks may bear undiseased ears, but usually plants grown from such ears are highly susceptible to attacks from the *Fusarium* rot fungi in the soil or elsewhere. The diseased ears can be largely excluded from seed corn by carefully selecting well-matured ears on healthy plants in the field and by special study of such seed on the germinator. Preliminary experiments show that by rejecting diseased ears the yields of corn may be materially increased, possibly as much as 10 or 15 or even 20 per cent in portions of the corn belt.

SIX SPECIES OF FUNGI MAKING THE PROBLEM COMPLEX.—Investigations to date indicate that there are at least six species and varieties of fungi which cause rots of corn, and one of these also causes scab, or blight, of wheat and other cereals. There are two important sources of infection for both corn and wheat—infected seed and old infected cornstalks; there may be still other sources of infection of wheat not yet determined.

TAKE-ALL AND FLAG SMUT OF WHEAT.

In April, 1919, the attention of the Bureau of Plant Industry was called to a serious outbreak of disease in the wheat fields of Madison County, Ill. Prompt investigation discovered a disease very similar to take-all, a very destructive disease of wheat in Australia and other parts of the Orient, as well as in some countries of Europe.

A few days later flag smut, a destructive disease of wheat in Australia, was discovered in wheat fields in the same county, and in some cases in the same fields as take-all. Pathologists of most of the wheat-producing States, together with a number from the United States Department of Agriculture, were immediately called together in Illinois in order to become personally familiar with these two diseases in the field. A survey of wheat fields, not only in Illinois but in many other States, was begun at once so as to determine whether one or both these diseases had become established elsewhere in this country. This survey resulted in the discovery of rather extensive infection in Madison County, Ill., with less extensive infection in two other counties in that State and in three counties in Indiana.

In cooperation with the Federal Horticultural Board and the authorities of Illinois and Indiana, action has been taken designed to prevent the spread of these two diseases and finally to eradicate them, if possible. The State officials have established quarantine areas, including the infested fields and the fields which surround them.

THE NEMATODE OR EELWORM DISEASE OF WHEAT.

The nematode disease of wheat has been found in Maryland, Virginia, West Virginia, and Georgia and has done considerable local damage. Investigation has shown that the disease attacks rye virulently; also oats, emmer, and spelt to some extent. Experiments have shown conclusively that the nematodes live over winter in the soil.

A wheat crop may become infected either from the seed or from the soil. To escape infestation, fields should be sown with seed wheat free from nematodes. Such seed wheat may be obtained either from uninfested fields or by treating wheat infested with nematode galls with a 20 to 25 per cent salt solution. In this brine the sound wheat will sink and the nematode galls will float, when they can be removed and destroyed. Experiments show conclusively that sowing seed wheat containing nematode galls without such treatment results in a heavily infected crop. Sowing clean seed wheat on infested soil also results in a serious infection of the crop, but clean seed wheat sown on clean land gives a clean crop, even though adjacent to infested fields.

CONTROL OF CEREAL SMUTS.

In the fall of 1917 a campaign was started, in cooperation with the extension services of the cereal-growing States, for the prevention of cereal smuts controllable by seed treatment. This work was continued throughout the fiscal year 1919. Demonstrations of methods of seed treatment were held in 28 States, a large number being given in each State. Departmental field assistants addressed groups of farmers and showed them the details of the methods of seed treatment. As a result there was a great increase in the quantity of seed grain treated in the last two years. Fully 25 per cent more farmers treated seed for the 1918 crop than for the crop of 1917. The results for the crop of 1919 are not yet compiled, but it is estimated that a still larger increase took place in the percentage of seed treated.

BLACK-CHAFF OF WHEAT.

Studies on the biology of the bacterial organism causing the black-chaff of wheat have continued, and numerous field observations were made on its distribution. It occurs in many places in Iowa, Kansas, Nebraska, and the neighboring States. This trouble is transmitted on the seed wheat, and wherever it is possible farmers are urged to procure seed wheat from fields which have not shown the disease.

A method of control by means of seed treatment has been discovered, which works remarkably well in the laboratory, greenhouse, and experimental plat, but is yet to be tried on a large scale under field conditions in the Middle West. This treatment consists in soaking the infected seed (after proper screening) for 10 minutes in formalin diluted with water in the proportion of 1 part to 400 parts of water. The former objection to the use of formalin, that either it did not kill all the surface organisms or else that it destroyed also a considerable portion of the seed, has been overcome by causing the seeds to absorb considerable water in advance of treatment. By giving the seed wheat a preliminary water bath for 10 minutes, after which it is drained and kept moist (covered) for six hours, the seeds absorb about 30 per cent of water and become much more resistant to the germicide. They are then plunged for 10 minutes into the formalin water, drained, and are kept moist (covered) for another six hours in order to secure the full surface effect of the small amount of formaldehyde vapor remaining. They are then spread out thinly to dry and should be sowed the next day.

CROP DISEASES.**POTATO DISEASES.**

The investigations of potato mosaic, extending over several years, have yielded particularly valuable results during the past season in the way of proof of the means of dissemination of this disease and the possibilities of control through the roguing of seed plats. It has been shown that the mosaic is transmitted through stem grafts and tuber grafts, through transference of the plant juices mechanically, and by aphids. The establishment of these facts is an important step toward the working out of control measures for this disease.

Following the discovery in the fall of 1918 of the potato wart in the mining districts in the vicinity of Hazelton, Pa., the investigations already in progress were extended and enlarged. In cooperation with the Federal Horticultural Board and the Pennsylvania authorities a careful survey was made of the territory contiguous to the point where the wart was first discovered, and many gardens were found to be infested. A laboratory for the investigation of the disease has been established at Freeland, Pa., in cooperation with the Pennsylvania Department of Agriculture and the State Agricultural Experiment Station.

The studies of potato leaf-roll during the past year have included observations of the symptoms of this disease under varying conditions throughout the country. Our knowledge of this disease has been further increased through the results of comparative studies of the anatomy of healthy plants and those infected with leaf-roll.

WATERMELON DISEASES.

During the past season a special effort has been made to educate the southern grower in the methods of controlling the two most serious diseases of watermelons, anthracnose and stem-end rot. The Melon Distributors' Association, the United States Railroad Administration, and the State extension departments cooperated in this work. A field campaign was carried out, through which the methods for the control of these diseases were brought to the attention of the public by means of posters, printed cards, bulletins, and lantern slides. In the case of stem-end rot an effort was made to secure the stem treatment with disinfectant paste of all melons shipped from Georgia, Florida, South Carolina, and Alabama, the four States which have suffered most from this disease in the past. It is estimated that in 1918 more than 2,500 carloads of watermelons, almost 20 per cent of the total shipments from these four States, rotted in transit, the chief trouble being stem-end decay. The results to date of the inspection of cars treated this season show that the loss in these cars has been reduced to less than 1 per cent. A very general application of the stem treatment has been made possible by the fact that the United States Railroad Administration required the prepayment of the freight on untreated carloads.

Spraying for the control of watermelon anthracnose was also carried out this season under the supervision of our field assistants on approximately 3,400 acres of melons in Florida with satisfactory results. Tests of the practicability of seed treatment on a commercial scale for the control of watermelon anthracnose are being made on areas comprising about 2,000 acres in Indiana, Missouri, and Arkansas which have been planted with seed disinfected with mercuric chlorid.

CUCUMBER DISEASES.

The investigation of cucumber diseases, extending over several seasons, has yielded important results within the past year. Three of the most destructive and widespread diseases, mosaic, anthracnose, and angular leaf-spot, have received major attention. A prominent development in the study of the mosaic disease has been the discovery of a method of overwintering. The results of recent work have shown that a considerable percentage of seed from mosaic plants of the wild cucumber may produce diseased plants the following spring. In this way the first mosaic centers are established, from which the disease is later carried to the cultivated crop in the near-by fields by the striped cucumber beetle and other insects. Additional evidence has been secured that the disease is also carried over winter in the seed of cultivated mosaic cucumbers.

Continued studies of cucumber anthracnose and angular leaf-spot have proved that these diseases live over winter in the soil on dead diseased plants and other refuse and that they are also carried on the seed from infected fruits. A successful and practical method of seed disinfection by means of mercuric chlorid has been worked out and applied on a commercial scale, with successful results in the control of both these diseases when combined with proper rotation of crops.

TOMATO DISEASES.

Particular attention has been devoted during the past season to the control of early-blight, or nailhead spot, of tomatoes in Florida, which causes serious losses in shipments to northern markets. Laboratory and field studies have shown that infection by this disease can take place only on small immature fruit. After the fruit attains a size approximately 2 inches in diameter, infection, even under the most favorable conditions, is impossible. It follows, therefore, that loss from this disease in transit can be avoided by packing only sound and mature fruit and that control measures must be applied in the field. Preliminary experiments have shown that spraying with Bordeaux mixture is an effective means of control.

THE MOTTLING DISEASE OF SUGAR CANE.

There are several diseases of sugar cane that deserve special attention. Some of these, such as the root-rot and red-rot, have been known in this country for several years, but exact control measures have not been worked out. The malady most recently discovered in the cane fields of the United States is the mosaic or mottling disease, which has been known in Porto Rico for several years and has apparently existed in Cuba, Java, and Hawaii for a longer period. The cause is not known. It is propagated through the seed cane and probably is carried from plant to plant by one or more species of insects. The disease does not infect the soil and certain varieties of cane are immune to it. Of the susceptible varieties some are more readily and seriously affected than others. A systematic survey has been started in the cane States in order to determine the extent and seriousness of the infestation. It is known to be present on all susceptible varieties at Audubon Park and at Cairo. This disease, though very destructive, is not considered as serious as root-rot.

POWDERY MILDEW OF THE APPLE.

Apple powdery mildew has recently been causing great alarm among the apple growers in the irrigated sections of the Northwest. Complete control is usually secured by the application of sulphur sprays early in the season. When late applications are necessary, sulphur can not be used, as it is sure to cause injury. Various other spray materials are being tested for use late in the season.

SPRAY MIXTURES FOR CITRUS TREES.

The special spraying requirements of citrus trees have necessitated a comprehensive testing of combinations of spray materials. A method has been found for combining oil emulsion with lime-sulphur solution, and the resulting combined spray mixture gives promise of reducing the number of spray applications necessary and in increasing effectiveness in the routine treatment of citrus trees throughout the year.

NEMATODE INFESTATION OF CLOVER SEED.

Early in the summer of 1919 attention was drawn to the fact that a clover disease of considerable importance had visited southern Idaho and other irrigated districts of the Northwest. It was a

disease which had been previously known but evidently had been increasing in its intensity for several years. It had made such headway in the clover fields of Idaho in a short time as to lead to the suspicion that some unusual agency was at work. Attention was at once given to the possibility of the transmission of the disease through the seed, with the result that it was shown that clover seed, even when re-cleaned, carries a considerable number of nemas, and in the case of the Idaho seed in particular it was shown to carry four different species of nemas, one of them belonging to the genus *Tylenchus*, namely, the well-known *Tylenchus dipsaci*, or *Tylenchus devastatrix*, the cause of a serious disease of bulbous plants and about 20 other crop plants, among them red clover. A general examination disclosed the fact that some living larvæ of this particular species occurred in clover seed 9 to 10 months after it was harvested.

WHITE-PINE BLISTER RUST.

White-pine blister-rust infection on *Ribes* is general in the New England States and northeastern New York. Many widely distributed incipient pine infections are beginning to appear as a result of heavy *Ribes* infection in 1915 and 1916, but the disease has not yet had time to produce severe damage to pines on a large scale. Infested areas vary in size from a few pine trees within a hundred feet of infecting *Ribes* to 50 per cent of the pines within a radius of half a mile from diseased bushes.

It appears that in many regions the plan of protecting white-pine timber by the systematic eradication of *Ribes* will prove to be an economically sound policy.

In this campaign cooperation is maintained with the New England States and New York. The work is devoted almost entirely to perfecting cheap and effective methods of destroying wild *Ribes*, to practical demonstrations of these methods on local control areas, and to the encouragement of effective local eradication of *Ribes* in cooperation with towns, associations, and individuals.

Experience thus far gained on demonstration and local control areas has proved that under normal conditions at least 95 per cent of the wild *Ribes* on a given area can be removed at a cost ranging from 5 cents to \$1.50 per acre. It is too early to draw absolute conclusions as to the effect of *Ribes* destruction on the demonstration control areas during the past two years, but there is a noticeable lack of recent infection of pines on these areas, while on adjacent areas where *Ribes* have not been removed there is a steady increase in pine infection.

Intensive studies of infection centers have been made to obtain data as to the distance to which the disease may be carried from *Ribes* to pine. The limit of 1,700 feet, which is in use at the present time, is an arbitrary one, based on data now available.

Various chemicals and sprays are being tested in the hope of finding a cheap and practical means of killing wild *Ribes*. The results obtained indicate that dip oil, fuel oil, and possibly sodium arsenite can be used economically to destroy dense growths of *Ribes* where the cost of hand pulling is excessive.

The inspection of nursery stock and pine plantations and the general scouting for the disease on pine and Ribes are carried on in New Jersey, Pennsylvania, and the southern Appalachian region; also in the Middle and far Western States. Formal or informal cooperation is maintained with these States. One or two planted trees were found diseased last year in Pennsylvania, in Michigan, and also in New Jersey. In the last-named State the disease was also found on four patches of cultivated Ribes.

Scattered pine and currant infection exists in Wisconsin and Minnesota. It is not yet clear whether the complete eradication of the disease will be practicable in these States. The results of scouting in the far Western States indicate that this region is free from white-pine blister rust. Continued scouting in these States is most important and should be actively pursued during the period required for the solution of the Minnesota-Wisconsin infection problem.

CITRUS-CANKER ERADICATION.

The work of eradicating citrus canker from the citrus regions of the South is progressing steadily. No epidemic outbreaks of serious proportions have occurred during the year in any of the States affected, and a gradual reduction of inspection work has been possible without jeopardizing the eventual complete eradication of the disease.

REPORT OF THE FORESTER.

HENRY S. GRAVES, *Forester.*

THE EXTENSION OF FORESTRY PRACTICE.

The year covered by this report was signalized by a new movement for extending the practice of forestry. More than 20 years ago the Division of Forestry offered to give advice and assistance to private timber owners who might wish to consider applying forest management. The offer received a remarkable response and formed a real turning point in the forestry movement. For the first time forestry in the United States became something which a business man could grasp and weigh on its merits as a definite business proposal. This aided powerfully in bringing the whole question of forestry, public as well as private, before the country. But it did not result in any widespread acceptance of the practice of forestry by timberland owners.

The failure of this early movement to get private forests extensively under management was, however, not immediate. The Division of Forestry made its offer of cooperation early in the fiscal year 1898. By the close of the fiscal year 1905 requests had been received for the examination of private holdings, large and small, comprising all told more than 10,900,000 acres of land. Many requests were from lumber companies and other owners of extensive timber tracts. On the strength of the showing made by the preliminary examinations, a number of these large owners entered into cooperative agreements for

the preparation of working plans. The interest of the lumbermen was much increased by the fact that the young foresters were able to show them that they were losing money by certain wasteful practices. Closer utilization spread rapidly through the industry. Public interest in forestry and an intelligent idea of what it meant became general. In the early years of the present century it really looked as though the management of forests as permanent productive properties might be voluntarily undertaken by private owners on a very large scale. Although many obstacles were presented by the internal conditions of the lumber industry, progressive lumbermen were giving much serious attention to the possibility of engaging in the practice of forestry. The chief stimulus was furnished by the rising value of stumpage.

The panic of 1907 radically changed the situation. The lumber industry entered a period of protracted depression. From that time on private forestry made relatively little progress in the United States, except on farm woodlands. While public forestry has made vast strides, the forests of the country that are in private hands are being depleted with very great rapidity, and almost everywhere without effort to renew them. A grave situation is becoming manifest in various ways. This is why the Forest Service is now putting forth a new and energetic effort to call public attention to the facts and to propose a program that will afford relief.

The problem presented is one that can be solved only by public action. The general practice of forestry on privately owned lands in the United States will not take place through unstimulated private initiative.

The magnitude of the National Forest enterprise and the prominence given to its accomplishments have given the impression to some that the problem of forestry is under way of solution. In point of fact, this is by no means the case, for the National Forests represent in area only about a quarter of the forest area of the country and less than that proportion of the actual standing timber. Private owners therefore hold more than three-fourths of the present timber supplies of the United States. The amount of material which is actually placed on the market from the National Forests amounts to only about 3 per cent of the entire consumption of the country. The rest comes from private lands. While the proportion will be altered, the country must still look to private lands for a large part of its forest supplies.

The rate of depletion of our forest resources is more than twice, probably three times, what is actually being produced by growth in a form which will be servicable for products other than firewood. High prices of lumber are not wholly due to the increased cost of labor and materials. A part is due to the ever-retreating sources of timber supply. Already the supplies of all our eastern great centers of production are approaching exhaustion with the exception of the South, and even there most of the mills have not over 10 to 15 years' supply left of virgin timber. Already the southern pine is being withdrawn from many points as a competitive factor and its place taken by western timbers, with consequent freight charges which the consumer must pay. Communities needing to build roads and other public works which involve increased taxation are often having brought sharply to their attention the economic consequences of stripping off the forests and leaving in their stead unproductive

wastes of low taxable value now or in the future. These facts are recalling public attention to the effects of uneconomic and wasteful exploitation of our forests in the past and to the need of steps which will put a stop to the destructive processes and replace them with methods which will build up rather than injure the country.

The situation necessitates a broad policy of forestry for the whole Nation which will include both an enlarged program of public acquisition of forests by the Government, the States, and municipalities and protection and perpetuation of forest growths on all privately owned lands which may not better be used for agriculture and settlement.

The proposed plan for realizing these objectives contemplates cooperation between the Federal Government and the States. The Government and the States must join hands in working out a program that will bring into correlation the various public and private efforts for the protection and right handling of forests. The function of the Federal Government, in addition to handling the National Forests, would be to stimulate, guide, and coordinate State action and conduct necessary investigations regarding the best methods of forestry, to assist the States in classification of land, and to harmonize action as between the different States. The States would also have a function in handling public property owned by them, and they would have a further direct responsibility in connection with the protection and perpetuation of private forest lands.

In the matter of private forestry the Government would work primarily through State agencies. To initiate the proposed policy there should be a Federal law authorizing the Government to cooperate with the States in bringing about the protection and right handling of forest lands within their borders, and providing means for such cooperation.

The net result of the steps already taken to inaugurate and organize the new movement for forestry has been to attract renewed and widespread attention to the fact that a real forest problem must be reckoned with, and is of national concern; to establish a conviction in the minds of many who have first-hand knowledge of the facts that definite action to protect the public interests involved and safeguard a resource essential for economic and industrial stability is now required; and to secure what is believed to be a feasible program, of a character to command general acceptance as it becomes fully understood.

THE NATIONAL FORESTS.

RECEIPTS AND OPERATING EXPENSES.

The receipts from the National Forests in the fiscal year 1919 were greater by \$783,484.79 than in the previous year. This is the largest increase ever made in a single year. The receipts totaled \$4,358,414.86.

To this total the grazing business contributed \$2,609,169.85, the timber business \$1,540,099.96, special uses (i. e., the occupancy of lands for miscellaneous purposes), \$136,822.99, and use for water-power development, \$72,322.06. The receipts from grazing exceeded those of 1918 by \$883,347.91, while the receipts from timber declined \$93,549.46. Special uses showed a gain of \$15,616.05, and water power a falling off of \$21,654.29.

The falling off in the receipts from timber was not due to any material reduction in the current timber sale business but is explained

chiefly by the fact that in 1918 settlement was secured under a court judgment of a claim against one of the transcontinental railroad companies amounting, with interest, to \$89,264.

The increase in the receipts from grazing was due to the fact that last year the final step was taken in carrying through the advance in the grazing fees, proposed in 1916 and inaugurated in 1917.

With the stockmen paying more than two and one-half million dollars annually into the public treasury for use of the National Forest ranges, there is strong reason for their urging that the Government expenditures aimed at making the range more useful should be increased. Unquestionably the value of the range, to the live-stock producers and to the country, can be developed to a higher point by constructing more improvements and pushing further the investigations which make possible the most efficient and complete utilization of the forage crop and the most highly perfected methods of live-stock management. Since the Government receives a return on what may be called development expenditures, in the form of additional grazing fees, increased expenditures for this purpose would seem wise as well as reasonable.

That the receipts from grazing now exceed those from timber by more than a million dollars and form 59 per cent of the total receipts from all sources is due to the fact that practically the entire forage crop can under present conditions be utilized, while the annual timber cut is but an insignificant fraction of the sustained yield obtainable from the Forests, or of the total cut of the country. There is very little range which is not accessible to live-stock, but the bulk of the timber is still out of reach of the lumbermen.

The receipts of 1919 were 175 per cent of those of 1915, while the cost of operating the Forests has remained practically stationary during these four years. The appropriation act for the current year made increases in the items for a number of the individual Forests, aggregating \$266,074. Most of these increases were to strengthen the protective system on the Forests where the danger of costly and destructive fires is greatest because of the inaccessibility of the country. These new funds did not become available until after July 25, when the fire season was reaching its height, which precluded the carrying out of the plans contemplated when the increases were asked for. Before the end of June the worst fire season ever faced in the Northwest had begun. When it ended the expenditures for fire fighting had so far exceeded the appropriation for that purpose that it became necessary to ask a deficiency appropriation from Congress of \$2,950,000. Again, as in last year's report, it must be pointed out that greater outlays for fire prevention, early detection, and swift concentration of fire-fighting forces would be much more economical.

THE NATIONAL FOREST PROPERTIES.

The net area of the National Forests at the close of the fiscal year 1919 was 153,933,700 acres, as against 155,374,602 acres June 30, 1918. The corresponding gross areas were 174,261,393 acres and 175,951,266 acres. The gross area includes all lands within National Forest boundaries; the net area excludes alienated lands.

These figures indicate a decrease of 1,440,902 acres in net area and a decrease of 1,689,873 acres in gross area. Eliminations made either by presidential orders or proclamations or by special acts of Congress

totaled 1,658,989 acres, in 25 National Forests. The act of February 26, 1919, creating the Grand Canyon National Park, eliminated from the Kaibab and Tusayan National Forests and transferred to the Grand Canyon National Park 606,720 acres. State selections authorized under a proclamation of June 4, 1912, were approved in the St. Joe National Forest, in Idaho, aggregating 21,262 acres. Eliminations by Executive orders or presidential proclamations, as a result of the land classification that is now nearing completion, reduced the National Forest areas 1,031,007 acres. Furthermore, a considerable acreage passed into private ownership under the usual operations of the mining laws and the Forest homestead act.

These reductions in area were in a small degree offset by three small public-land additions. Presidential proclamations increased the Dixie National Forest in Utah 8,328 acres and the Humboldt Forest in Nevada 28,020 acres. By the act of March 3, 1919, 2,886 acres were added to the Minam Forest in Oregon.

Increase of the National Forests in the East through purchases continued at a conservative rate. The total net area of public land in the National Forests established from purchase areas now aggregates 1,347,666 acres. Of this amount 1,333,405.03 acres have been purchased, the remainder being unoccupied and unentered public lands in the Alabama National Forest. At the close of the fiscal year there remained a total of 396,493 acres approved for purchase by the National Forest Reservation Commission and under process of acquisition, and the plans for ultimate acquisition embraced additional areas aggregating 4,422,167 acres. The purchase activities were largely confined to areas previously approved for purchase and to the consummation of negotiations already pending. The National Forest Reservation Commission desires, so far as practicable, to round out and complete the present purchase areas for practical administrative units before initiating purchase activities in other regions.

At the close of the fiscal year there were pending in the Interior Department proclamations providing for additions in the Western States totaling 283,780.54 acres. Of this 75,050 acres represents additions in the State of Wyoming authorized by special acts of Congress. The prevailing sentiment in the public-land States is now generally favorable to the extension of the Forests. This is indicated by the fact that at the present time there is pending in Congress legislation providing for 10 different additions to National Forests in the public-land States in which such additions can only be made with the consent of Congress. These proposed additions aggregate approximately 1,700,000 acres. The most important of the projects now before Congress is one for adding to the Idaho and Payette National Forests the region commonly known as the Thunder Mountain country, of approximately 1,120,000 acres. This proposed addition was discussed in last year's report. It has been strongly urged by successive sessions of the Idaho State Legislature, and is very desirable in order to give this area the protection and regulation it has so long and so urgently needed.

PROTECTION.

Mention has already been made of the emergency condition which arose during the fire season of 1919 in the Northwest. Th

National Forests of western Montana and northern Idaho are heavily timbered, and most of the country which they cover is exceedingly mountainous, rugged, and undeveloped. Because of its wild character, its remoteness from centers of population and bases of supply, its lack of means of communication, its large stand of valuable timber and importance for watershed protection, and because of the climatic conditions, it presents the problem of protection in its most extreme form. Nowhere else, experience has proved, is the control of fires so difficult or so expensive.

The region is subject to severe droughts, in which almost no rain may fall for months; when such drought seasons occur the forests become almost like tinder; and frequent electric storms supply the sparks. Lightning fires generally start in the high mountains, where they are most difficult to reach and fight. Their control necessitates special provision, first, for discovering and getting to them quickly before they have gathered headway; and, secondly, for throwing against them and maintaining in the field large forces of fire fighters in case their immediate suppression becomes impossible.

The experience of the past season simply emphasizes the conclusion set forth in my report of a year ago. The protective system must be strengthened along lines which will permit of quicker work. The choice is between, on the one hand, provision for a moderately expanded regular protective organization or, on the other hand, unnecessarily large danger of terrific fires and huge emergency expenditures. Last summer these emergency expenditures for fire fighting in the western Montana and northern Idaho Forests came to more than ten times the regular protective funds provided for the same Forests. While the danger of great fires can no more be entirely eliminated on the National Forests than it can in our large cities, it can and should be minimized.

Control of last summer's fires was made especially difficult by various circumstances. The delay in the enactment of the Agricultural appropriation bill embarrassed the early building up of the protective organization. Labor was at times difficult to secure to the extent needed, and was generally less efficient than usual; while it was always hard to secure men experienced in fire fighting for foremen. Very serious, however, was the further fact that the Forest Service has been losing its trained men very rapidly, owing to its inability to hold men at the present rates of compensation prescribed by law; and in consequence in many cases the forest officers were comparatively new men or men who had been recently transferred from some other district and had not yet become thoroughly familiar with the local country. Undoubtedly this was responsible for failure in a number of instances to get fires extinguished more promptly and economically.

Through a succession of unusually dry years the Forest Service has been able to prevent a catastrophe. It has held down the loss of merchantable timber to an amount which, under the circumstances, is reasonably small. It has prevented injury and destruction to property worth several hundred million dollars. On the other hand, a large expenditure has been required to fight fires, and in the aggregate a large area of old burns has been burned over, with resulting destruction of a great deal of young growth. The reasons for the failure to secure better results may be summed up as follows:

(1) The Forests have not yet been sufficiently opened up with roads and trails. It is still necessary in many cases to build trails through the woods to the fires. This may require several days, during which a fire may have become a great conflagration.

(2) The regular protective force is insufficient.

(3) The Forest Service is almost wholly unequipped with motor transport. Aside from the fact that the cost of hiring trucks to transport men and supplies for fire fighting is very large, the difficulty of obtaining such transportation sometimes results in failure to reach a fire before it is too late. Adequate equipment with motor trucks would save a great many thousand dollars each year.

(4) Successful fire protection is absolutely dependent on a permanent force of trained men. Without that, fires which should be put out promptly with little loss or cost spread widely and require many thousands of dollars to prevent disaster, let alone extinguish them.

(5) Public sentiment in many places has not yet roused to the need of care in the forest and public cooperation. There are still too many railroad fires, too much carelessness in the woods, particularly from smoking, and too many fires from clearing land.

The answer to the forest fire problem is therefore more roads and trails, sufficient salaries for our forest officers to enable the building up and holding of a well-trained force, greater leeway in furnishing motor equipment for fighting fires, which could also be used in road improvements, and a more vigorous campaign to educate the public to better cooperation in fire protection.

There were relatively few large fires during the fiscal year on the National Forests elsewhere than in the northern Rocky Mountains and Pacific Coast States, although unfavorable conditions were widespread. In the last six months of the calendar year 1918, after an early summer fire season of unusual danger in all parts of the West, except in Colorado, Wyoming, and South Dakota, where light rains fell with sufficient frequency to mitigate the drought, the situation improved materially as the season advanced. The fall rains generally set in early; and in the Southwest, where the fire danger occurs in two distinct seasons, one in the spring and early summer and one in the fall, the fall fire season was of short duration, with good showers at frequent intervals. In southern California conditions were threatening until late in the fall, but throughout the State the fires of the latter part of the calendar year 1918, were well controlled. Especially notable was the reduction in the number of man-caused fires in California which followed a vigorous campaign of public education waged by the Forest Service in cooperation with State and other public agencies. In Minnesota no large fires burned on the National Forests, in conspicuous contrast with what happened in other parts of the State. In the southern Appalachian Forests the climatic conditions during the fall were less favorable than normally, but only one large fire occurred; this was on the Shenandoah, in October.

The following table gives certain statistics regarding the 1918 fires. The total number, 5,573, shows a reduction of 2,241 from the number which occurred in the previous calendar year. The area of National Forest lands burned over was 694,651 acres, as against 962,543 in 1917; the estimated damage on these lands was \$688,332, as against \$1,358,627; and the total cost of fire fighting was \$714,009.63, as against \$1,121,451.

Fires on National Forests, calendar year 1918.

Extent and causes of fires.	Number of fires.	Percentage of total.	Extent and causes of fires.	Number of fires	Percentage of total.
Area burned over:			Causes of fires:		
Under 0.25 acre.....	2, 475	44. 41	Railroads.....	613	11. 09
Between 0.25 acre and 10 acres.....	1, 572	28. 21	Lightning.....	2, 457	44. 09
10 acres and over, damage under \$100.....	1, 146	20. 56	Incendiary.....	257	4. 61
10 acres and over, damage \$100 to \$1,000.....	270	4. 85	Brush burning.....	361	6. 48
10 acres and over, damage over \$1,000.....	110	1. 97	Campers.....	943	16. 92
Total.....	5, 573	100. 00	Lumbering.....	104	1. 86
			Unknown.....	658	11. 81
			Miscellaneous.....	175	3. 14
			Total.....	5, 573	100. 00

Of the 110 fires listed above as having burned over an area of 10 acres and more with damage in excess of \$1,000, 35 were in Idaho, 30 in Oregon, 14 in Washington, and 12 in California. In total number of fires of all classes California came first, with 1,148, followed by Idaho with 832, Oregon with 775, Montana with 573, and Washington with 563. Seventy per cent of all the fires occurred in these five States.

Since the fire season of 1919 is not yet closed, final statistics regarding this year's fires can not of course be given. Preliminary estimates indicate an area burned over up to September 30 of approximately 1,500,000 acres, while the fire fighting expenditures from July 1 to September 30 were close to \$3,000,000.

MANAGEMENT.

TIMBER.

There was a decrease of 3 per cent in the cut of National Forest timber under sales, and of 0.5 per cent in the receipts from sales. In a period when the lumber cut of the United States as a whole dropped off 11 per cent, this sustained use of National Forest timber indicates the stable source of supply which has been established in the National Forests for the local lumber industry and for the general timber requirements of the country. New sales of timber decreased 45 per cent. This decrease is attributable to the war production conditions existing during the first part of the year and to the high cost of steel rails, machinery, and other materials, which has discouraged the development of new lumbering enterprises in the National Forests.

Since April, 1919, the lumber market has been characterized by advances in prices exceeding in rapidity anything previously known in the history of the industry. This condition appears to be due to the sudden and wide-spread resumption of building activity and to the shortage of existing lumber stocks. The production of lumber is responding but slowly to this demand on account of the shortage of labor and the high cost of supplies. The advance in lumber has, however, been reflected during the last three months in a sharpened demand for National Forest stumpage, which bids fair to increase materially the rate of cutting. Such increases will be progressive and somewhat slow, because a certain length of time is required for

the appraisal and advertisement of large tracts and time is needed also for new installations under present conditions.

One of the more important developments in forest management which must be pushed with vigor is to determine within closer limits than has yet been possible the quantities of timber which may be cut from forest units on a basis of permanent production. The demand for National Forest timber in some localities has about reached the growing capacity of the areas forming the logical source of supply. It is of the utmost importance that the industrial developments supported by National Forest stumpage be permanent and that no pressure for the immediate use of timber be permitted to exhaust such National Forest areas within a few years, leaving a wake of sawdust piles and deserted lumber camps. The general principles upon which this development of National Forest management has been undertaken are: (1) To define areas, on the basis of topographic features or of industrial and economic factors, from which a steady yield of timber should be obtained; and (2) to determine the safe limit of yearly sales from each area in order that the yield may be continuous. Securing permanent and desirable conditions for labor in forest industries is an important phase of this development.

A second important extension in the effective use of National Forest timber is to obtain exact data upon their resources for making paper, both as to suitable woods and as to hydraulic power; and to make these resources available to paper manufacturers under practicable terms in view of the transportation and other conditions attending the extension of their industry into the Western States. The National Forests contain upward of 200 billion board feet of timber suitable for the manufacture of news print. Sales of pulpwood are now being made at a number of points as part supply for established paper plants. Several large tracts of timber of paper-making species have been appraised and advertised for sale or offered to the paper trade. Transportation conditions, labor problems, and the large investments required for the installation of paper plants have held back the development of such enterprises on the National Forests, notwithstanding the favorable timber and water-power conditions which are to be found at many points. This development, however, is bound to come, in view of the general paper situation in the United States; and the Forest Service is preparing for it.

Owing to the handicaps imposed by the reduction of field personnel in consequence of the war, timber surveys have been materially curtailed since 1916. With the prospect of increased activity in sales to lumber manufacturers and the need to be ready for the demand for timber likely to arise from paper manufacturers, it is important to expand again the timber-survey work. This work is fundamental to plans for wise management. During the year 448,547 acres were cruised and mapped by intensive methods and are now ready for timber sales, while 37,551 acres were covered by extensive reconnaissance.

The Agricultural appropriation act for the fiscal year contained a special provision for granting National Forest timber required for war purposes to any department, board, or committee of the Federal Government. Owing to the late passage of this measure, but one permit was granted under it to the War Department. This covered 6,000,000 feet, board measure, of which approximately

3,750,000 board feet were cut. Permits aggregating 5,758,000 board feet were issued to the Alaskan Engineering Commission under the act of March 4, 1915. This commission has cut to date approximately 30,000,000 board feet, under permit from the National Forests in Alaska.

Details regarding the cut and sale of timber are embodied in the following tables:

Timber cut under sales, fiscal year ended June 30, 1919.

State.	Board feet.			Value.		
	Commercial sales.	Cost sales.	Total.	Commercial sales.	Cost sales.	Total.
Alaska.....	44,764,000		44,764,000	\$99,893		\$99,893
Arizona.....	41,174,000	333,000	41,507,000	95,135	\$264	95,399
Arkansas.....	21,772,000	242,000	22,014,000	62,224	195	62,419
California.....	84,703,000	1,210,000	85,913,000	189,785	666	190,451
Colorado.....	46,762,000	1,320,000	48,082,000	87,827	995	88,822
Florida.....	578,000		578,000	1,234		1,234
Georgia.....	1,725,000		1,725,000	4,744		4,744
Idaho.....	63,550,000	4,252,000	67,802,000	160,011	3,170	163,181
Michigan.....	236,000		236,000	344		344
Minnesota.....	8,418,000		8,418,000	33,107		33,107
Montana.....	66,031,000	5,971,000	72,002,000	144,768	4,958	149,726
Nevada.....	1,504,000	61,000	1,565,000	2,110	45	2,155
New Hampshire.....	4,116,000		4,116,000	21,268		21,268
New Mexico.....	40,633,000	419,000	41,052,000	91,139	367	91,506
North Carolina.....	4,876,000		4,876,000	15,503		15,506
Oregon.....	114,911,000	2,669,000	117,580,000	233,781	1,576	235,357
South Dakota.....	14,663,000	757,000	15,420,000	33,323	697	34,020
Tennessee.....	1,711,000	156,000	1,867,000	3,874		3,991
Utah.....	13,759,000	915,000	14,674,000	31,014	699	31,743
Virginia.....	6,709,000	16,000	6,725,000	17,768	15	17,783
Washington.....	78,073,000	576,000	78,649,000	119,013	308	119,321
West Virginia.....	2,000		2,000	10		10
Wyoming.....	25,436,000	700,000	26,136,000	57,573	598	58,171
Total, 1919.....	686,156,000	19,597,000	705,753,000	1,505,481	14,670	1,520,151
Total, 1918.....	707,182,000	21,641,000	728,823,000	1,511,825	16,300	1,528,125

Timber sold fiscal year ended June 30, 1919.

State.	Board feet.			Value.		
	Commercial sales.	Cost sales.	Total.	Commercial sales.	Cost sales.	Total.
Alabama.....		15,000	15,000		\$82	\$82
Alaska.....	47,650,000		47,650,000	\$81,216		81,216
Arizona.....	69,967,000	494,000	70,461,000	139,249	396	139,645
Arkansas.....	10,627,000	286,000	10,913,000	47,096	217	47,313
California.....	239,919,000	1,981,000	241,900,000	565,006	1,087	566,093
Colorado.....	54,536,000	1,501,000	56,037,000	123,158	1,130	124,288
Florida.....	1,911,000		1,911,000	4,825		4,825
Georgia.....	1,977,000		1,977,000	4,927		4,927
Idaho.....	79,898,000	6,329,000	86,227,000	151,532	4,727	156,259
Michigan.....	268,000	3,000	271,000	292	2	294
Minnesota.....	4,043,000		4,043,000	19,086		19,086
Montana.....	28,462,000	8,256,000	36,718,000	60,642	6,662	67,304
Nevada.....	854,000	72,000	926,000	1,060	54	1,114
New Hampshire.....	2,580,000		2,580,000	11,376		11,376
New Mexico.....	15,299,000	541,000	15,840,000	42,826	399	43,225
North Carolina.....	36,549,000		36,549,000	112,350		112,350
Oregon.....	92,192,000	2,866,000	95,058,000	237,355	1,636	238,991
South Dakota.....	24,843,000	811,000	25,654,000	68,905	698	69,603
Tennessee.....	4,776,000	200,000	4,976,000	15,404	150	15,554
Utah.....	11,983,000	1,399,000	13,382,000	27,998	1,092	29,090
Virginia.....	4,509,000	16,000	4,525,000	9,886	15	9,901
Washington.....	32,312,000	637,000	32,949,000	71,728	334	72,062
West Virginia.....	2,000		2,000	10		10
Wyoming.....	8,052,000	860,000	8,912,000	19,493	770	20,263
Total, 1919.....	773,209,000	26,267,000	799,476,000	1,815,420	19,451	1,834,871
Total, 1918.....	1,425,238,000	28,041,000	1,453,279,000	3,295,516	21,341	3,316,857

Number of timber sales, classified according to amount of sale, fiscal year ended June 30, 1919.

State.	\$100 or under.			\$101- \$500	\$501- \$1,000	\$1,001- \$5,000	Over \$5,000.	Total.
	Com- mercial.	Cost.	Total.					
Alabama.....		8	8					8
Alaska.....	500		500	1	3	18		522
Arizona.....	696	169	865	4	1	6	1	877
Arkansas.....	38	76	114	8	5	3	4	134
California.....	373	353	726	14	9	12	9	779
Colorado.....	529	232	761	12	7	15	7	802
Florida.....	24		24			1		25
Georgia.....	57		57			1		58
Idaho.....	599	1,364	1,963	12	6	12	9	2,002
Michigan.....	8	1	9					9
Minnesota.....	6		6			1	1	8
Montana.....	674	1,894	2,568	121	7	8	2	2,606
Nevada.....	69	6	75					75
New Hampshire.....	120		120	2	1	3		126
New Mexico.....	694	251	945	7	4	6	1	963
North Carolina.....	109		109	5	5	5	1	125
Oregon.....	243	466	709	7	2	3	3	724
South Dakota.....	342	144	486	8	6	12	2	514
Tennessee.....	56	56	112	1		2	1	116
Utah.....	458	725	1,183	7	4	1	1	1,196
Virginia.....	266	8	274	2		2		278
Washington.....	213	128	341	6	1	3	3	354
West Virginia.....	1		1					1
Wyoming.....	152	140	292	3	3		1	299
Total, 1919.....	6,227	6,021	12,248	120	64	114	46	12,592
Total, 1918.....	6,670	5,907	12,577	160	89	147	64	13,037

1 cost sale.

REFORESTATION OF DENUDED LANDS.

Notwithstanding the drought during the last two seasons, a good percentage of success has been secured in most of the forest plantations on denuded lands in the National Forests. This is probably due to the experience which has been gained in the production of nursery stock and in the more effective methods of planting it in the field. A total of 6,911 acres was planted and seeded during the fiscal year. The largest planting operations are being conducted in the Northwest. Small plantations in the Lake States have been very successful, and the work will be largely extended in this region within the next five years. Some of the older plantations conducted by the Forest Service, particularly near Halsey, Nebr., are now assuming forest proportions and establishing veritable forest conditions in the midst of vast areas of treeless land.

The details of planting and sowing operations are given in the following table.

Planting and sowing on National Forests, by States, 1919.

State.	Area planted.	Area sowed.	Total.	State.	Area planted.	Area sowed.	Total.
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>		<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Oregon.....	1,449.00		1,449.00	California.....	179.00		179.00
Idaho.....	1,344.00	150.00	1,494.00	New Mexico.....	31.00		31.00
Montana.....	1,000.00		1,000.00	Arizona.....	3.00		3.00
Colorado.....	612.32		612.32	Nevada.....	1.20		1.20
Washington.....	533.00		533.00	South Dakota.....	1.00		1.00
Nebraska.....	513.63		513.63	Florida.....	.33		.33
Minnesota.....	441.00		441.00				
Michigan.....	399.00		399.00	Total.....	6,761.38	150.00	6,911.38
Utah.....	253.90		253.90				

RANGE.

Very exceptional range conditions characterized the seasons of 1918 and 1919. The closing of the 1918 season marked the termination of a prolonged drought throughout the Southwest, particularly in New Mexico, Arizona, and Texas. A very severe winter with a heavy snowfall followed, which caused heavy losses of stock of all classes. The 1919 season throughout the Southwest was unusually favorable for forage growth. Throughout Montana, Idaho, Utah, Wyoming, northern Colorado, the western half of Nebraska, and North and South Dakota, however, one of the most severe droughts in the memory of the oldest stockmen has prevailed. This drought probably reached its greatest intensity in Montana, northern Wyoming, eastern Utah, and Idaho. For three years the precipitation in this region during the growing season has been very light, but the 1919 conditions were the worst. The snowfall at the beginning of the year in the entire drought region was unusually small, and while a few heavy snows fell in the latter part of the winter, the snow did not pack and disappeared rapidly when warm weather set in. Temperatures during April and early May were much above normal, causing the snow to melt and run off sooner than usual. This caused a shortage of water for irrigating and stock watering purposes.

Forage growth of all kinds started early, with indications of a good season. Heavy freezes, however, during the last few days of May destroyed all of this new vegetation, upon which the sheepmen were dependent for feed for their flocks during the lambing period. These conditions also affected the cattlemen to some extent, as their stock did not immediately begin to increase in flesh. A long period of low precipitation immediately followed in the States above named, which greatly reduced forage growth.

The stream flow was far below anything previously recorded, and this had a direct influence upon the raising of farm crops, particularly hay, which has been reported as from 20 to 50 per cent below normal.

The production of forage on the unreserved public lands was very restricted, and the stockmen using these areas were forced to seek other range. The National Forest ranges, being at higher elevations, were not so greatly affected, and stockmen who held Forest permits were considered very fortunate. During the early part of July heavy rains occurred in northern Arizona, southern Utah, and parts of Nevada, which relieved range conditions materially throughout this region and reduced the drought area considerably. During the latter part of July rains occurred in northern Utah and southern Idaho. While they came too late to cause any appreciable increase in the hay crop, an immediate improvement in the summer, fall, and winter range was noticed, thus still further reducing the drought area.

The range situation looked so critical early in July that the Department of Agriculture considered it necessary to assist the stockmen in the drought regions. A committee organized for this purpose immediately undertook a canvass of the drought-stricken region to determine the numbers of stock for which other pasturage or winter feed would have to be provided in order to avoid placing this stock upon the market, and also sought to locate in other States places where feed or pastures could be secured for wintering stock shipped in from the drought-stricken region. The Forest Service cooperated with the

committee in making the canvass, by gathering data regarding the stock on the National Forest and adjacent ranges. It appeared that very heavy shipments would have to be made from the intermountain region. The situation in Montana and Wyoming was even more critical, for in many places in these States the estimates indicated that at least 75 per cent of the stock would have to be shipped to market or feeding points.

The relief committee, with the cooperation of many county agencies, agricultural representatives, and other Department representatives, is assisting stockmen to avoid the necessity of placing their drought-stricken stock on the market at a sacrifice by directing them to winter feed. In addition, it has been developed that large quantities of hay are available in the Middle Western States at prices sufficiently low to permit of its shipment into the drought regions for winter feeding. This fact with the localized rains that occurred over a large portion of the region during the latter portion of the season will greatly reduce the number of stock to be disposed of on account of lack of feed. The conditions in eastern Idaho, Wyoming, and Montana have not greatly improved, and it will be necessary for the stockmen in those States to make heavy shipments.

Live stock and wool prices fell off materially during the year. In the fall of 1918 prices were unusually good. An unusually mild winter, except in the Southwest, brought the stock through in excellent condition, without the necessity of heavy expenditures for hay or concentrated feed. The first evidence of declining prices was observed in the wool sales last spring. In addition the stockmen had serious difficulties in securing competent help. Old employees familiar with range conditions and Forest regulations readily found more remunerative and easier positions in other lines of work.

The importance of the National Forest ranges to the stockmen was strongly emphasized by the events of the year. Never before was the demand for range on the Forests so great. This was particularly true in the drought-stricken regions, where stockmen, using the unreserved public domain or private pastures, eagerly sought Forest permits in order to save their stock. The value of the system of range regulation in use has been so thoroughly demonstrated that at the public lands convention held in Salt Lake City on August 21—a gathering of representative stockmen from all of the Western States—the convention went on record in favor of placing the remaining unreserved public lands under Federal control and having them managed under a plan similar to that in effect on the National Forests.

A plan for granting 5-year permits was put into effect on a large number of the Forests. It is too early to determine the results.

Larkspur eradication upon the scale desired proved impossible, partly for lack of men to supervise the work, partly because the scarcity and high cost of labor prevented the stockmen from cooperating extensively. However, larkspur was eradicated from 1,657 acres during the year, making a total of 3,580 acres grubbed since the work began, at a cost of \$5.50 per acre. The stockmen contributed about one-half the expense. A resultant saving in cattle of \$34,000 annually is estimated, on the basis of the average previous recent death loss and a valuation of \$50 per animal.

It was planned to carry on the eradication work for the season of 1919 on all projects not completed, and to undertake grubbing on new

areas where cooperation could be secured and funds were available. The exact acreage infested is not definitely known, but from the number of cattle reported as dying on infested ranges it is evident that a large saving is feasible. With the present great demand for Forest range and high prices for cattle the need for continuing the eradication work can not be overemphasized.

The following table shows the number of permits issued and number of stock grazed upon the Forest ranges during the fiscal year ended June 30, 1919:

Grazing permits issued and number of stock grazed.

State.	Cattle, horses, and swine.				Sheep and goats.		
	Permits issued.	Number of stock grazed.			Permits issued.	Number of stock grazed.	
		Cattle.	Horses.	Swine.		Sheep.	Goats.
Alabama.....	2	59					
Arizona.....	1,570	360,011	6,509	637	160	364,853	6,604
Arkansas.....	452	4,591	80	494	15	49	230
California.....	3,021	208,683	7,019	3,324	551	606,526	13,286
Colorado.....	4,455	380,460	9,503		872	1,044,208	1,322
Florida.....	23	787		6			
Georgia.....	48	440	14	15	3	23	
Idaho.....	4,213	190,608	13,794		1,093	1,758,877	
Michigan.....					2	91	
Montana.....	2,865	170,674	16,524		521	835,224	134
Nebraska.....	54	12,757	713				
Nevada.....	502	77,432	4,320		109	390,753	
New Hampshire.....	15	158	12				
New Mexico.....	2,020	174,979	5,309	467	576	440,302	39,051
North Carolina.....	186	1,157	52	56	5	82	
Oklahoma.....	57	3,304	294				
Oregon.....	2,478	162,004	10,066	88	537	753,418	52
South Dakota.....	786	38,185	3,184		8	12,200	
Tennessee.....	47	431		5	5	75	
Utah.....	7,249	172,246	9,914	67	1,641	811,510	110
Virginia.....	273	2,614	15		1	6	
Washington.....	1,031	30,743	2,318		196	236,307	
Wyoming.....	1,181	143,204	3,611		329	680,670	
Total, 1919.....	32,528	2,135,527	93,251	5,154	6,624	7,935,174	60,789
Total, 1918.....	32,600	2,137,854	102,156	3,371	6,513	8,454,240	57,968

There was a reduction of 72 cattle and horse permittees and an increase of 111 sheep and goat permittees, making a net increase for both classes of 39 as compared with the previous year. Fewer cattle, horses, and sheep were grazed, but the number of swine and goats slightly increased. The horses grazed on the National Forests are very largely of a small and inferior type which do not return a profit to the owner; consequently there has been a marked tendency on the part of these owners to dispose of their horses and substitute more valuable kinds of stock.

It will be observed that the decrease in the number of cattle was insignificant—only 2,327; but that the number of sheep was decreased by over 500,000. During the grazing seasons of 1917 and 1918 the number of cattle on the National Forests was increased over 379,000 head and the number of sheep over 611,000 head, as a war emergency measure. Since the closing of the war it has been necessary to reduce the number of stock on many of the ranges to prevent serious damage to the ranges. Investigations showed that forage could be provided for practically the full number of cattle, but that a reduc-

tion in the number of sheep to practically the prewar number was imperative. The bringing into use of more range for cattle through the eradication of poisonous plants, securing a more uniform utilization of the forage on the cattle range through better distribution, and the adoption of the common use of range by cattle and sheep whereby a limited number of cattle utilize forage not palatable for sheep are the reasons why there has been practically no reduction in the number of cattle.

LIVE-STOCK ASSOCIATIONS.

Regulated management of the National Forest ranges during the past 14 years has had a marked influence on the formation of live-stock associations and the development of this field of activities. The old system under which each permittee gave individual attention to his stock while on the range is being widely replaced by a pooling of interests along certain lines, accomplished by forming live-stock associations with executive committees to handle many of the details of stock management. Many of the executive committees employ herders for the stock while on the range, buy and distribute salt, in some cases buy bulls, and take charge of other management and improvement matters which promote the best interests of the permittees and the highest use of the range. The method employed is the adoption of special rules, passed by the association and approved by the Forest Service. Compliance with these rules is then required of all users of the National Forest range involved. Practically all of the more progressive associations have adopted such special rules as meet the needs of their localities. Membership in the association is open to all live-stock owners using the range in question, and a majority of all users must belong to the association in order to secure its recognition by the Forest Service.

The advantages of cooperation are shown by the number of live-stock associations recognized by the Forest Service. In 1917, 359 stock associations were cooperating with the Service. Last year there were 544, an increase of over 51 per cent. So firm are the owners of live stock that graze upon the National Forest ranges in their belief in the value of organization that of the 4,246 permittees in the States of Oregon and Washington over 3,000 are members of live-stock associations.

In many cases advisory boards have recommended reductions in the number of stock upon a given range; they have also suggested changes in grazing seasons, with a view to securing the greatest benefits to the users and an improvement in the range. In practically all cases associations have interested themselves in constructing range improvements such as drift fences, in water development, in the eradication of poisonous plants, and similar matters. The expenses for the improvements are secured through assessments. The value of organized cooperation is most evident on range allotments where conditions of use are very intensive and the permitted stock belongs to a large number of small owners.

WATER POWER.

Not much water power development has taken place since the United States entered the war. Increased war demands for electric power could not be deferred for the time necessary to construct

water-power plants but had to be met in greater part by the construction of new steam plants and by the interconnection of existing plants. At present financial and industrial uncertainties and the unsatisfactory character of Federal laws are resulting in further postponements of water-power utilization. Any considerable utilization of our undeveloped water powers must await both the enactment of legislation and the stabilization of the general economic situation.

The receipts from water-power permits and easements were \$72,322.06, as compared with \$93,976.35 for the fiscal year 1918. Ten applications for preliminary rental permits were received, 14 for final rental permits or easements (of which 9 were for transmission lines only), and 11 for free permits or easements (of which 3 were for transmission lines only). Data concerning projects under permit at the close of the year are given in the following tabulation:

Water-power sites and transmission line rights of way under permit and easement, fiscal year 1919.

Class of permits or easements.	Transmission lines only.			Power projects ¹ (reservoirs, conduits, power houses).		Total number permits or easements.
	Number of permits or easements.	Length in miles.		Number of permits or easements.	Estimated average output (in horse-power) at minimum discharge.	
		Within Forest boundaries.	On National Forest land.			
Permits or easements in force at close of fiscal year:						
Rental permits or easements—						
Preliminary.....				13	180,633	13
Final.....	148	1,063.78	789.01	91	767,751	239
Free permits or easements.....	20	146.70	111.09	92	8,580	112
Total.....	168	1,210.48	900.10	196	956,964	364
Construction completed at close of fiscal year:						
Rental permits or easements.....	147	1,061.00	786.95	76	311,293	223
Free permits or easements.....	20	146.70	111.09	81	7,734	101
Total.....	167	1,207.70	898.04	157	319,027	324
Construction incomplete at close of fiscal year:						
Rental permits or easements.....	1	2.78	2.06	8	223,037	9
Free permits or easements.....				8	814	8
Total.....	1	2.78	2.06	16	223,851	17
Construction not stated at close of fiscal year:						
Rental permits or easements.....				20	414,054	20
Free permits or easements.....				3	32	3
Total.....				23	414,086	23

¹ With or without transmission lines.

RECREATION AND GAME.

Plans for the management of the National Forests must aim to provide for an orderly development of all their resources, for the use and benefit of the public. Such plans would be incomplete if they failed to take into account the wild life and the recreation resources.

Use of the National Forests for recreation was greater than ever before. There is not a single Forest, and there is scarcely a ranger

district, which does not have some features of recreation interest. Sometimes it is the mountain scenery, sometimes the beauty of forests, lakes, and streams, sometimes the opportunities for sport in the form of fishing, hunting, or mountain climbing, and sometimes it is still other kinds of attractions which lead yearly increasing number of visitors to the Forests for recreation and health.

Because of this expanding use adequate administration of the recreation resource has become of marked importance. The western National Forests are, by virtue of their location and character, the natural public playgrounds for most of the country west of the Mississippi, and they also draw many thousands of visitors from the East. They must be handled with full recognition of their recreation values, present and future. This requires careful and forward-looking plans providing both for the protection and the development of this important resource.

Protection of the recreation resource involves measures that will safeguard for the use and enjoyment of the public the natural attractions which appeal to visitors and cause them to seek the Forests and also measures that will reserve for their use adequate supplies of wood and forage and afford pure water. Development of the resource is a still larger matter. It involves many things, but the most urgent primary need is provision of facilities for traversing the Forests and for living while in the Forests.

All these matters received attention. In cutting timber, operations are adjusted to protect scenic features, roads, camping places, and the like against loss of attractiveness. Forage is reserved for the horses of recreation parties. Water protection is looked after through sanitary regulations, the provision of hotel and other accommodations is encouraged, information of various kinds supplied, and in general the convenience and comfort of visitors promoted.

Of particular importance for the increase of use is the systematic and progressive development of roads and trails by which the Forests are being made more generally accessible. Every road and trail, whether it is built primarily for protection or for the development of some material resource, opens up new features of scenic interest. In a variety of other ways also development to meet the increased demand for recreation use is being undertaken. A number of recreation centers are being made ready for the public under plans carefully worked out by recreation engineers. Various such centers are already in use, such as the Red Fish Lake and Wood River recreation areas in the Sawtooth National Forest in Idaho, Eagle Creek on the Columbia River Scenic Highway near Portland, Oreg., Denny Creek on the Sunset Highway near Seattle, Huntington Lake in the Sierra National Forest, the Los Angeles Municipal Camp in the Angeles Forest, and the Laguna Mountains recreation area between San Diego and the Imperial Valley. At many other points the Forest Service is constructing shelter houses, improved camping places, etc.

It is becoming manifest, however, that an adequate policy of recreation involves still more. The services which can be rendered the local and general public, on the one hand, and the resources available for meeting these needs, on the other hand, need to be studied in the most comprehensive and thorough-going manner to the end that coordinated development of all these resources—whether found within

the National Forests, or in National Parks, or in properties belonging to States and municipalities—may be secured. For example, the full recreation value of the Oregon National Forest, which surrounds Mount Hood and borders on the Columbia River Valley, can be realized only through a development coordinated with what the City of Portland and the Counties of Multnomah, Hood River, and Clackamas have undertaken to do and have largely accomplished. Such a coordination has in this particular case been effected, with most happy results. Again, recreation development in the Yellowstone Park region can not be made to serve the public interests to best advantage if National Forest administration is uncorrelated with the administration of Park, and vice versa. In short the National Forests, which must be administered with a view to recreation use as one of their major functions, can not carry out that function in fullest measure except through cooperative relations with other agencies in the same field, resulting in joint effort under a truly national and common policy.

The wild life resource of the National Forests is in many ways closely related to recreation. It comprises mainly the game, the fish, and the fur-bearing animals, and the matter of most immediate importance is suitable provision in the administrative plans for the perpetuation of the existing herds of elk.

In spite of difficulties created by war and other conditions that made it necessary to carry on the ranges all the domestic live stock for which a place could safely be found, progress was made in working out better methods of elk conservation and in providing more ample feeding grounds for the herds in and around Yellowstone Park. In general, recognition of the fundamental problem involved has been secured to a greater degree than ever before, and an increased public support has been obtained in carrying out the protective and constructive work necessary to solve the problem. The Forest Service is formulating as fast as possible plans which will coordinate the various other uses of the National Forests with game conservation. This is especially important in connection with grazing use. In places it is necessary to restrict or entirely prohibit grazing in order to take care of the elk. The most important single situation of this kind is that near the Yellowstone Park.

For several years a study has been conducted by the Forest Service in cooperation with the Biological Survey of the habits of the Yellowstone elk, their requirements, and other matters, knowledge of which is necessary as a basis for a practical program. This program, which was completed during the past year, calls for certain legislative and administrative action. A beginning was made on the administrative phases by imposing added restrictions upon the use by domestic stock of portions of the National Forests adjoining the park. Some lands were wholly reserved and others restricted to limited use by cattle during certain months. A beginning was also made in the progressive exclusion of stock from areas where total exclusion could not be put into effect at once. The program for handling the Yellowstone elk was placed before the public with a view to full discussion and consideration of the proposals for State and national legislative action.

While it may require slight changes and revisions from time to time as conditions alter, it is believed that the underlying principles are essentially correct. The program was approved by the Benevo-

lent and Protective Order of Elks at its last annual meeting, as well as by the leading sportsmen of the country. The study of these herds must necessarily be continued until the working plan is fully established.

The study of the Sun River elk herd in the Lewis and Clark Forest was continued, and an examination of the area used by the Roosevelt elk in the Olympic Forest was made to determine the number of elk in this herd, the range used during the different seasons of the year, and the number and kind of animals that would have to be disposed of annually if it appears that the herd should be maintained at its present size but not permitted to grow larger, on account of lack of suitable feeding grounds to support a greater number without recurring seasons of starvation.

Marked progress was made during the year in bringing together the interests of the States and the Federal Government in game matters. In various instances it has been possible to make State and Federal authority mutually supplementary in accomplishing things difficult for the Government or State working alone.

COOPERATION WITH STATES.

While the forest fire protective systems maintained by the States in cooperation with the Federal Government have been extending, there has also been a recent greatly increased cost of operation. The appropriation of \$100,000 is now very inadequate.

Expenditures from the Federal appropriation, and the expenditures of the States which have entered into cooperative agreements, are shown in the following table. The area protected was much greater than ever before. This was made possible by the fact that the cooperative funds contributed by States and private owners were greater than in 1918. The Federal fund was of course the same as in 1918.

Cooperative expenditures from Federal appropriation and by the States for protecting forested watersheds of navigable streams from fire.

State.	Expenditure fiscal year 1919.			State.	Expenditure fiscal year 1919.		
	Federal.	State.	Total.		Federal.	State.	Total.
Maine.....	\$7,296.73	\$125,893.03	\$133,189.76	Wisconsin.....	\$4,023.63	\$16,261.44	\$20,285.07
New Hampshir.	6,554.23	23,218.58	29,772.81	Minnesota.....	8,807.32	56,519.39	65,326.71
Vermont.....	2,217.62	2,158.67	4,376.29	South Dakota.....	282.00	4,988.00	5,270.00
Massachusetts.	3,294.50	32,781.52	36,076.02	Montana.....	2,499.95	8,905.38	11,405.33
Rhode Island..	92.25	4,097.53	4,189.78	Idaho.....	4,565.34	46,229.73	50,795.07
Connecticut....	1,025.00	5,217.10	6,242.10	Washington.....	9,692.63	37,162.26	46,854.89
New York.....	7,221.98	117,131.08	124,353.06	Oregon.....	10,210.16	24,966.72	35,176.88
New Jersey....	1,968.90	20,743.92	22,712.82	Administration			
Maryland.....	2,524.65	3,819.95	6,344.60	and inspection	7,110.49	.....	7,110.49
Virginia.....	2,725.34	3,259.83	5,985.17	Total.....	39,921.38	625,445.54	725,366.92
West Virginia..	4,005.00	9,140.40	13,145.40	Unexpended			
North Carolina.	1,207.16	2,433.77	3,640.93	balance.....	78.62		
Kentucky.....	2,129.00	5,538.22	7,667.22	Appropriation..	100,000.00		
Louisiana.....	2,581.00	9,451.83	12,032.83				
Texas.....	3,276.00	4,609.20	7,885.20				
Michigan.....	4,289.50	60,917.99	65,198.49				

An agreement entered into with Rhode Island made that State the twenty-third to enter into cooperation. Toward the end of the fiscal year California requested cooperation, but the agreement had not been completed when the year closed.

Protection from forest fires is the first essential to forest conservation. Without an organized and efficient system, such as can be maintained only with adequate regular appropriations, the forests can not be made safe. No better proof of this could be given than the situation which arose in Minnesota in the fall of 1918, when a large number of relatively small fires burned for weeks because of lack of men and equipment to extinguish them, and finally came together in five large conflagrations, according to the State Forester, which in the aggregate swept over not less than 200,000 acres, destroyed property worth about \$25,000,000, and caused a loss of more than 400 lives. Estimates based on forest fire statistics collected in cooperation with State and private agencies indicate that in the calendar year 1918 not less than 25,000 fires occurred, with an area of fully 10,500,000 acres burned over and a financial loss in timber, young tree growth, and improvements of about \$40,000,000. Railroads caused approximately 18 per cent of the fires, brush burning and campers each 13 per cent, lightning 10 per cent, incendiaries 9 per cent, miscellaneous causes 7 per cent, lumbering 5 per cent, and unknown causes 25 per cent.

The States of Alabama, Florida, Georgia, Idaho, Illinois, Maine, Massachusetts, Montana, New Hampshire, North Carolina, Tennessee, and Texas received assistance during the year in formulating forest policies, drafting forestry laws, and the like.

RESEARCH.

INVESTIGATIONS IN FOREST PRODUCTS.

From many standpoints the fiscal year 1919 was the most important in the history of the Forest Products Laboratory. Not only were many of the research projects started earlier in the war brought to a productive conclusion, but the peace-time application of their results was aggressively undertaken through widespread dissemination of the information and through personal contact with the wood-using industries.

During the first months of the year the laboratory was engaged exclusively on special war problems. Cooperation with the various bureaus of the War and Navy Departments which had provided special allotments was at its height, and requests from these departments had become increasingly specific. After the armistice was signed it was necessary to reduce the staff from 458 to approximately 300 persons and to discontinue some of the less important investigations. In accord with the desires of the War and Navy Departments, however, the more important projects which were nearing completion, or which were of special value, were continued. A number of new research projects were begun, but the year's accomplishments were, primarily, the outgrowth of fundamental research begun earlier in the war or prior to the beginning of the war.

Aircraft problems continued to occupy the position of greatest importance. The large fund of available data on wood, plywood, and glues found direct application in the solution of specific problems arising from time to time in the design of aircraft. Many requests were received from the War and Navy Departments for the development of various aircraft parts which could not well be designed without actual tests. Much of this work developed as a result of the successful design by the laboratory of a plywood wing rib for one of the Army planes.

Ribs for almost a dozen different types of Army and Navy planes were designed and tested by the laboratory and gradually improved to the point of maximum strength and minimum weight. These ribs were, in all cases, decidedly superior to commercial ribs of corresponding sizes. In addition to the specific design of these ribs, general laws governing the types of ribs to use for different sizes were developed, and several excellent types of large ribs perfected.

The design of airplane wing beams presented many complicated problems, and the laboratory was called upon to conduct elaborate series of tests on full-sized members to determine the relative merits of the many different types. The growing scarcity of suitable aircraft woods, demanding closer utilization of existing supplies, made it necessary to develop types of built-up beams which would permit the use of small and short stock. Tests were made upon several hundred beams of a number of different types, and several types were developed to meet the specific requirements involved.

Exhaustive tests were also made upon many different types of beam splices, and their relative efficiency was determined. As an integral part of these tests, the efficiency of various kinds of hide and casein glue was determined. Later in the year, assistance was requested in the design of a wing beam, or the development of a type suitable for very large machines, with spans of 125 feet or more. Special series of tests were made for this purpose, and a type was developed which embodies sound mechanical principles and is remarkably light for its strength.

Much specific information was needed by the Army and Navy in regard to the struts being used on various machines, and comprehensive tests were made by the laboratory upon various kinds and sizes. These resulted in the development of two noninjurious methods of testing struts, whereby the actual strength of each strut could be determined without injuring it. Machines for the proper carrying on of these tests were also developed, and specifications for the inspection of struts by this means were prepared. This method of test is unique, in that there are no other types of structural members which can be tested to their maximum load without injury. In addition, methods for the calculation of the strength of tapered struts and for the determination of the taper which would give the maximum efficiency were developed.

An entirely different kind of investigation was undertaken by the laboratory to develop a type of strut for extremely large flying machines. A radical departure was made from all accepted types of airplane struts, and a type selected which years of experience in the construction of buildings and bridges had proved to be very efficient in long light columns. This type was then modified to suit aircraft needs, and developed to a point where it was much stronger for a given weight than any other type of strut which has so far been developed. Wind-tunnel tests on models specially constructed for the purpose showed that the air resistance of this type is less than that of any other type so far tested.

Elevator and aileron spars, which are the main structural members of airplane control surfaces, are subjected to a peculiar kind of stress known as combined bending and torsion, and their design has always been a matter of guesswork. In the case of small machines this method of design appeared to be quite satisfactory,

but in the design of radically new types of great size need was found for accurate data on the design and also for a better type of spar, which would be both stiffer and stronger for the same weight. Through a unique combination of hollow wood and veneer construction, it was possible for the laboratory to improve the spars to a marked degree, both in strength and in stiffness. As a result of this development, the laboratory was finally requested to design a complete control surface, embodying this new type of spar.

Numerous and varied other aircraft developments were carried out, among them being the development of a flexible plywood for control surfaces and of a special mechanism for the proper operation of these surfaces. This plywood and the control mechanism are in process of being fitted to one of the fastest machines developed during the war.

One of the major lines of research was the determination of the effect of various kiln-drying schedules upon the properties of aircraft woods and substitutes for them. Exhaustive tests have furnished conclusive evidence that under proper control of temperature and humidity kiln-dried material of these species is as strong as air-dried lumber. They show further that the kiln-drying schedules recommended by the laboratory at the beginning of the war and based upon the incomplete data then available were in every sense dependable and are subject to practically no material changes. Up to the date of the armistice, assistance had been given in the design, installation, and operation of 325 Forest Service water spray kilns installed in 44 manufacturing plants throughout the country, including installations at the Government cut-up plant of the Spruce Production Division, and at the Rock Island Arsenal. At the latter plant a laboratory representative demonstrated that artillery wheel dimension oak, green from the saw, can be kiln-dried with insignificant loss in from 60 to 90 days as against 3 to 5 years of air seasoning. This was contrary to previous commercial experience. Other kilns were designed for use at Government arsenals, aircraft factories, gun manufacturing plants, and vehicle plants. The Signal Corps dry kilns at Vancouver, Wash., were started in June, 1918, under the personal supervision of a kiln expert from this laboratory. The first kiln load of airplane wing beams was taken out on July 16. Thereafter the kilns were continuously operated at full capacity of about 40,000 feet per day until the end of the war. A corps of kiln experts was maintained in the field to assist vehicle, furniture, and aircraft manufacturers in the adaptation and operation of commercial kilns used in war work, and intensive courses of training for Government and commercial dry-kiln operators and inspectors were continued until the armistice was signed.

The total number of laboratory strength tests was brought up to over 300,000. About 23,000 strength tests were completed on 32 species of plywood, to determine the strength variation with different combinations of species, number of plies, and ratios of core to total panel thickness. Many additional tests were made to determine the relative amount of warping of various species of plywood, the bending strength and methods of fastening, the relative strength of rotary, sliced, and sawed veneer, and the shearing strength and shrinkage of plywood. Other tests were made on various aircraft

parts of plywood, laminated, and fabricated material, such as engine bearers, struts, landing-gear disks, wing ribs, elevator spars, etc. Determinations were made of the mechanical properties of thin plywood for use as a linen substitute, and the relative efficiency of various types of riveted and scarf joints was investigated.

Tests conducted for the War Department made possible great improvements in overseas shipping containers, and many inspectors were trained in the fundamentals of box construction, for manufacturing and export inspection work. Wood preservative specifications were prepared for the Emergency Fleet Corporation and for the Railroad Administration. To assist the latter in its program of preservative distribution made necessary by the shortage of creosote, substitute preservatives were tested and recommendations as to their use were made.

Studies were completed of the effectiveness of various methods of coating and finishing wood to prevent the passage of moisture. Improved methods of finishing with varnishes were developed, and it was shown that protective coating with thin sheets of aluminum leaf is practically 100 per cent efficient. In an experimental shipment of airplane propellers from this country to France those treated by the aluminum-leaf process developed at the laboratory were the only ones to arrive in satisfactory condition. This method has been officially adopted by the Army and Navy.

The experimental study of the conditioning and manufacture of airplane propellers began to yield information of great value. At the completion of the study it will be possible to specify accurately the species of wood and the manufacturing conditions for the production of the most efficient propellers for the many kinds of service.

A number of new and greatly improved formulas for making waterproof glues for plywood manufacture were developed. One of these for casein glue shows about double the water resistance of the available commercial casein glues and is very resistant to molds. The specifications of the Army and Navy for all glue and glue ingredients were prepared at the laboratory. Much of the work on glues was carried on for the purpose of preparing these specifications. Several commercial concerns have adopted the laboratory glues in production. Numerous improvements were discovered in plywood manufacture that have also been successfully adopted in production.

There were identified 30,863 samples of wood, including some foreign woods, and many microscopic examinations for decay and defects were made. Information illustrating defects in wood was collected, and an illustrated key for distinguishing true mahogany from so-called mahoganies was prepared for propeller inspectors. Studies were made of the effect of moulds on wagon and airplane woods, and of the effect of steam bending on the structure of wood.

Active work on the value of various woods for paper manufacture was discontinued during the war to devote more time to pressing war problems. However, a reliable method for determining the tearing strength of paper was developed. A recording density hydrometer was invented which will be of considerable use in the control of the soda recovery of sulphate and soda pulp mills, acid making in sulphite mills, mixing in the manufacture of ledger, bank-note, and other fine paper, and in the chemical and textile industries in general. The value of waste hemlock bark from paper mills as a source of tannin

was also demonstrated. Methods for the production of soda and sulphate pulps suitable for nitrating and for rendering sulphite pulps suitable for this use were developed.

Shortly after the armistice was signed the Salvage Board of the Ordnance Department requested the laboratory to determine the suitability of second-cut cotton linters and hull fibers for paper manufacture. The War Department had on hand at that time a large tonnage of these linters reserved for the manufacture of nitro-cellulose and was seeking the best means of disposing of the surplus. Commercial pulping trials and paper runs made at the laboratory soon demonstrated that second-cut linters and hull shavings can be pulped with decidedly less chemical and bleach consumption than wood, and that they are excellently adapted for the production of high-grade book, writing, blotting, tissue, and other papers. These experiments may well have a far-reaching economic influence on the future of the paper supply of this country. Arrangements have been made for a practical mill trial where the value of this raw material can be demonstrated on a tonnage basis under average mill conditions.

The laboratory cooperated with the Chemical Warfare Service of the Army in gas defense work and developed an artificially dense wood charcoal practically the equal of coconut-shell charcoal. A suitable gas-mask filter for the removal of solid particles was evolved and tested. Experiments were conducted also on various phases of gas offense.

The threatened shortage of wood pitch for filling the seams of wooden vessels led to experiments with various kinds of mineral pitches, and an experimental deck is now undergoing exposure tests. Several of the mineral pitches seem to be satisfactory.

The readjustment of the laboratory's work to a peace-time basis has included:

- (1) The adaptation and application of the data and information obtained during the war to the Nation's industries on a normal peace-time basis.

- (2) Analysis of special reconstruction problems and the extent to which the laboratory could be of assistance in solving them.

- (3) Consideration of prewar projects and the advisability of resuming them or of starting new researches which appeared of greater importance from a broad reconstruction standpoint.

An illustration of the peace-time application of research conducted in connection with a specialized war project is found in the work of the propeller section. It was soon seen that the developments worked out in relation to the conditioning of wood and the use and formulas of waterproof glues had a far wider field of application than merely to airplane propellers. Following the armistice, therefore, experiments were started in several different lines of built-up construction where possibilities for the utilization of small pieces and waste material existed. Sets of bowling pins, shoe lasts, hat blocks, wagon bolsters and tongues, and other articles were made of laminated material and tested in actual use. These tests in most instances already indicate that the laminated construction for such articles will be practically as serviceable as solid material.

As a result of the war there has been a very marked stimulation in and acceptance of the value of research in forest products, and

the requests for cooperation and assistance which have come to the laboratory from many different industries have more than taxed the organization. It has, in fact, become necessary to decline cooperation in a great many instances on account of the inability of the decreased force to carry on the work. There is now open to the laboratory a tremendous field of research of great economic and industrial value.

Close relations were maintained through an office of Forest Products in Washington with the various branches and offices of the War and Navy Departments located in Washington and needing the cooperation of the forest products organization, and also with the War Industries Board, the War Trade Board, the Shipping Board, the Emergency Fleet Corporation, the British and other Allied commissions, and various commercial organizations and associations having to do with war activities. In this way it was possible to furnish data and information on which immediate decision relating to the purchase, storage, or use of timber could be made. Much assistance was given in the preparation of specifications for making purchases of forest products for construction purposes, vehicles, boxes, airplane material, etc., and in the inspection of timbers for ships, airplanes, and docks. Extensive files covering a wide range of data on forest products were maintained for quick reference. A large volume of statistical data was furnished for the use of foreign governments. The figures on production and consumption in many instances served as a basis for reaching conclusions on problems of utilization, substitution, and regulation of imports and exports.

After the armistice was signed arrangements were made to continue cooperation with the Bureaus of Construction and Repair and Steam Engineering of the Navy and with the Air Service and Bureau of Ordnance of the Army, and for the completion of many projects which will yield information useful in peace as well as war. Recognition of the fact that the Forest Service is an authoritative source of information on forest products and their uses has put the office in a position to render considerable assistance to various departments.

FOREST INVESTIGATION.

Under "forest investigations" are included a wide range of studies. Some of them have for their purpose better knowledge as to the amount, character, and distribution of our present forests; others concern the demands made upon them for the supply of material of various kinds, probable future demands, and the methods of utilization; and still others seek to make possible better methods of utilization and the most beneficial contribution of our forest resources to the public welfare, through investigations basic to the successful practice of forestry. The studies are therefore partly economic and industrial, in which case they have to do largely with the gathering and interpretation of statistics of production, consumption, present timber stands, and similar matters, and partly woods studies of all the factors which control or affect forest establishment, renewal, composition, rate of growth, and character of material produced.

During the past year the forest investigations have been chiefly those connected with war activities and with the completion of the

work started during the war. Many such investigations which were in their midst when hostilities ceased called for completion because of the applicability of their results in the post-war period. Thus the study of the amount of black walnut available for airplane construction and for gunstocks was completed, and a publication prepared dealing with supplies, growth, and management of this valuable species. A summary report was also prepared of the available supplies of the kinds of timber most likely to be used in aircraft construction during peace time. The study of supplies of the most important timber species has furnished a good deal of knowledge of our timber resources which have distinct value as a basis for shaping measures aimed to secure perpetuation of these supplies, pending provision for a complete timber inventory such as is fundamental to the working out of a sound, thoroughly intelligent forest policy for the Nation. The requirements of the Government for forest products, together with the control of production for needs of the country not directly connected with the prosecution of the war, gave a more accurate conception of the broad situation in which we are placed regarding forest products. This, together with inquiries as to the timber situation in foreign countries, afforded a clearer perspective of how far our own forests can be expected to meet future domestic and foreign needs.

A few investigations were undertaken having directly in view the meeting of postwar problems. Because of the importance of Sitka spruce for aircraft production, a study was undertaken of its growth, yield, and management.

Because of the added importance, in view of renewed agitation of the national need for the practice of forestry on private lands and of a comprehensive program for securing the perpetuation of our forest resources through combined public and private action, of accurate data as to the growth and yield of the different types of forest and the costs that may be involved in securing forest replacement, many field measurements were restudied in the light of recent experience and new data were accumulated. While the facts available are sufficient upon which to base a plan for inaugurating a general policy, the actual carrying out of such a policy will demand the prosecution of forest studies more comprehensive and far more detailed than those hitherto undertaken if the plan is to be made to work fully.

Some of the fundamental prewar studies, such for instance as the relation between distribution of the different forest types and the climatic and soil factors that control them, the importance of farm woodlands in the economic management of the farm, studies of the physical, chemical, and biological properties of seed, studies of the causes of forest fires and the liability of different forest types to them, have been renewed and are to be pushed with vigor to completion. As a partial provision for meeting the need for fuller information relating to the proper handling of forests, a comprehensive scheme for forest investigation in cooperation with States and forest schools has been developed.

REPORT OF THE CHEMIST.

C. L. ALSBERG, *Chief*.

As last year was a year of readjustment within the bureau to meet the demands for assistance made by the Government's war machine, so this year has been one of return to the normal. During the war so much unusual work was required of the bureau that its momentum was temporarily checked, and it had to be content to keep the regulatory work as nearly as possible up to its prewar level. It could not hope to forge ahead. Since the armistice was signed, the bureau has gradually regained its prewar acceleration, with the result that, though four months of the year were war months, and though the armistice did not by any means halt work for the war agencies or make it possible to recruit the bureau's force up to its normal strength, nevertheless 1,133 recommendations for criminal prosecution and 1,052 for seizure alleging violation of the Food and Drugs Act were sent to the Solicitor—by far the largest total for any one year in the history of the enforcement of the Food and Drugs Act. This is not to be taken to mean that the war has lowered the ethics in this country of the food and drug producing industries as a whole, although it has increased sophistication and misbranding in certain special directions. It merely shows that the bureau's regulatory force is gaining in efficiency as it gains in experience, and that the gradual reorganization of the bureau, the evolution of which has been recorded in its reports from year to year, is bringing results.

While the regulatory force of the bureau, despite the depletion of its personnel, is performing a greater volume of work than ever before, the constructive research work has not yet returned to normal. Partly completed war research problems have had to be rounded out, that the time and effort originally expended upon them might not be wholly lost. Moreover, the lure of high salaries is stronger than ever, so that there has been a heavy drain upon the bureau's force through the passing of men from it into the industries. The totally inadequate salaries offered by the Government have made it impossible to fill suitably the gaps thus created. From July 1, 1917, to June 30, 1919, of the war period, the separations from the service, not including men who entered the military service, have been of the technically trained staff 39 per cent of the prewar strength of the bureau, of the clerical staff 68 per cent, and of the staff of laborers, mechanics, messengers, and the like, 90 per cent. The total separations from the whole bureau, the so-called "turnover," including men furloughed to enter military service, for the two-year period, has been 72 per cent, and there is no indication that conditions are improving. It is obvious that service in the bureau must be made more attractive, especially in its financial aspects, if such efficiency as the Bureau of Chemistry has been able to achieve in the past is to be maintained.

Nevertheless, the momentum of the bureau's research organization has been sufficient to produce a larger number of publications than ever before. There were issued nine department bulletins, two department circulars, two circulars of the office of the Secretary, and

one yearbook article. In addition, the results of more than 75 investigations were made public, and those of more than 25 are now in press. The experimental work upon a number of other investigations has been completed. Thirty-five applications for patents were filed, of which 14 were allowed, 6 disallowed, and 15 are pending.

Naturally the work demanded of the bureau by other branches of the Government has lessened since the armistice; but its volume is still considerable. There is every indication that, inasmuch as the war brought to the attention of other branches of the Government the services the bureau is capable of rendering, such collaborative work will never diminish to the prewar volume. It is essential, therefore, that adequate funds for such collaborative work be provided. Moreover, the growth of the bureau in the last 10 years has been such that the quarters available in Washington have long been inadequate, and if its work is not to be progressively crippled, suitable quarters must be provided.

ENFORCEMENT OF THE FOOD AND DRUGS ACT.

DOMESTIC FOODS AND DRUGS.

One thousand and fifty-two recommendations for seizure and 843 recommendations for criminal prosecution were made to the Department of Justice, through the Office of the Solicitor. Table 1 gives a list of the classes of products on which action was recommended to the Solicitor, and also the distribution of the recommendations among the various types of products.

TABLE 1.—*Recommendations of action on alleged violations of the Food and Drugs Act transmitted to the Solicitor.*

Product.	Crim- inal actions.	Seiz- ures.	Product.	Crim- inal actions.	Seiz- ures.
Beverages, extracts, flavors.....	21	15	Lard and lard substitute.....	2	.....
Candy.....	1	.....	Meat and poultry.....	20	3
Chocolate and cocoa.....	3	16	Nuts.....	.....	4
Coffee and tea.....	2	1	Oil, olive, salad, etc.....	193	130
Colors, food.....	8	.....	Oranges.....	.....	43
Dairy products.....	141	51	Preservatives.....	1	.....
Drugs, crude, and pharmaceutical preparations.....	47	37	Sea foods.....	19	39
Drugs, remedies.....	122	513	Sirups.....	11	1
Eggs and egg substitutes.....	48	23	Spices and relishes.....	.....	17
Feeds.....	306	27	Tomato products.....	50	41
Flour, grain, alimentary pastes.....	16	6	Vegetables.....	9	18
Fruits.....	19	7	Vinegar.....	35	9
Gelatin.....	40	25	Water.....	15	16
Glycerin.....	.....	1	Total.....	1,133	1,052
Jam, jelly, and marmalade.....	4	6			

Examination of Table 1 shows that action was recommended most frequently against shipments of patent medicines, crude drugs and pharmaceutical preparations; of mineral waters and nonalcoholic beverages; of shell eggs and egg substitutes; of dairy products; of gelatin; of olive oil; of oranges and tomato products; of sea foods; of cacao products; of vinegar; and of stock feeds.

In the patent medicine cases, it was alleged usually that they were misbranded as to therapeutic claims under the Sherley amendment. In the case of the crude drugs and pharmaceuticals it was usually alleged either that they did not comply with the requirements of

the United States Pharmacopœia and were not labeled to indicate wherein they differed from the standard of the Pharmacopœia, or else that they were otherwise misbranded or adulterated.

In the mineral water cases it was alleged, as a rule, that they were either polluted or misbranded as to therapeutic claims under the Sherley amendment, or both.

The expansion of the nonalcoholic beverage industry has made necessary a close supervision of this class of products. Among the various kinds of violations alleged the most common are based on the representation by the manufacturer that the products consist in whole or in part of fresh fruit juice, when, in fact, they contain only some organic acid and an artificial flavor. Some of these products were found to contain saccharin substituted in whole or in part for sugar.

The work on shell eggs was in the nature of a follow-up campaign of the action taken in previous years and described in the Report of the Chemist for 1918. The eggs arriving in the market continue to improve in quality. The action against egg substitutes is the outcome of the work inaugurated and described last year.

The investigation of dairy products was designed to continue the supervision of evaporated and whole milk received in interstate or foreign commerce. In addition it was found that the high price of butter stimulated its adulteration with water or salt, or both, so as to lower the fat content. Much attention has been devoted to putting a stop to this practice.

The work upon gelatin was a continuation of that described last year to suppress the sale of glue as edible gelatin.

The olive oil cases were brought in conformity with the campaign inaugurated in 1918 to prevent the adulteration with other edible oils of olive oil, which is still practically unobtainable from Italy, although it can be secured from other Mediterranean countries, notably Spain. In consequence, much Spanish olive oil of excellent quality has been misbranded as Italian oil, a practice which it has been attempted to abolish.

The work upon oranges, necessitated by the disastrous frost of last winter, was designed to prevent the sale of frozen fruit. Frozen oranges should be used for the preparation, near the point of production, of jams and preserves, for which they seem suited if used promptly.

While a number of cases have been made against tomato products, the quality of these products as a whole continues to improve vastly. The adulteration of canned tomatoes with added water is becoming rare, and less tomato pulp made from partially moldy or fermenting stock is being produced. Assistance continues to be rendered by the experts of the bureau to manufacturers through personal visits.

The work upon sea foods was confined largely to the adulteration of oysters and scallops with water, termed "soaking" by the trade, the slack filling of cans with shrimp, and the prevention of the sale to the consumer of stale or tainted canned salmon. The latter project occupied more of the time of the regulatory force of the bureau than any other, since it involved the examination in detail of the vast surplus stores of canned salmon held by the Army before they were permitted to be turned back into the ordinary channels of trade.

The cases upon cacao products dealt principally with the adulteration of cocoa with cacao shells.

The cases upon vinegar were of the usual type. A new method has been developed for the identification of waste apple products vinegar by means of which it is hoped that the traffic in this variety of vinegar may be controlled and forced on to a legitimate basis.

The cases against stock feeds comprised the usual types of adulteration and misbranding reported from time to time in previous years. Much attention was paid to rice mill by-products, especially the adulteration with rice hulls, and data were obtained upon the conditions prevailing in the rice mills of the Pacific coast and upon the use of lime in rice milling. It was also found that, owing to the difference in price between bran and shorts, certain manufacturers were selling finely ground bran as shorts.

Of the 1,019 cases of all kinds reported to the department as terminated in the courts during the year, 258 alleged false and fraudulent labeling of medicines, 22 alleged similar misbranding of veterinary remedies, and 56 alleged adulteration or misbranding of stock feeds. All in all, 3 cases were reported as decided unfavorably to the Government.

Among the cases terminated was the bleached flour case which was pending at Kansas City, Mo. (N. J. 6380). The libel was amended to strike out the allegation to the effect that the flour contains an added deleterious ingredient which might render it injurious, in view of the experimental work of the bureau which did not indicate that the allegation was tenable under the interpretation of the law by the U. S. Supreme Court (N. J. 3398). The claimant then withdrew appearance and answer, and a default decree of condemnation and forfeiture was entered as to the remaining allegations in the libel.

Publication has been made of two judicial decisions of interest, involving interpretation of the law. The U. S. Supreme Court, in a judgment reported in Notice of Judgment 6308, affirmed judgment of the lower courts against Oscar J. Weeks, doing business as O. J. Weeks & Co., in connection with the misbranding of an article labeled "Special Lemon, Lemon Terpene, and Citral." A salesman of the defendant in offering the article for sale represented it as lemon oil, which it was not. The defendant upon appeal insisted that under the statute the question whether an article is misbranded turns entirely upon how it is labeled when it is shipped, regardless of any representations made by a salesman in offering it for sale. The U. S. Supreme Court, however, held that the statute specifies and defines at least two kinds of misbranding, one where the article bears a false or misleading label, the other where it is offered for sale under the distinctive name of another article. The two are quite distinct, a deceptive label being an essential element of one but not of the other. The court accordingly ruled that testimony respecting the representations of the defendant's traveling salesman was rightly admitted in evidence and submitted to the jury.

The case reported in Notice of Judgment 6362 is one under the Sherley amendment to the Food and Drugs Act, alleging misbranding of "Dr. J. H. McLean's Liver and Kidney Balm." The Court of Appeals of the Eighth Circuit reversed a judgment of conviction in the lower court because of error in the instructions of the court, and a new trial was awarded. In the instructions to the jury on the

question of the fraudulent character of the statements made by the defendant regarding the article, the court inadvertently said that "one who makes a false statement not knowing whether it is true or false is as guilty of wrong as the man who makes a false statement knowing it is false." The Court of Appeals held this portion of the charge was erroneous, as it permitted the jury to find that these false statements were fraudulent although the defendant honestly believed them to be true.

Two hundred and two of the cases reported as terminated were instituted by 38 different State and city agencies, either independently of or in cooperation with the Bureau of Chemistry. In 1916 there were but 35 such cases instituted by but four collaborating agencies. This very great increase illustrates the growing interest of State and city officials in the Federal act as a supplement to city and State food and drug laws. A rather unusual form of cooperation is found in the enactment by the State of California of a law forbidding the sale of arsenic-bearing sulphur for use in the production of food products. This followed the publication by the bureau of a report upon the arsenic content of sulphur from different sources.

To supersede Circular 19, Office of the Secretary, Circular 136, Office of the Secretary, "Standards of Purity for Food Products," was issued. The service and regulatory announcements published during the year contained 25 opinions and 250 notices of judgment. The following food inspection decisions were issued:

No. 177. Soda Water Flavors and Soda, Soda Water.

No. 178. Milk and Cream.

No. 179. Amending Regulation 29, Which Relates to Marking the Quantity of Food in Package Form.

No. 180. Colors in Food.

Nos. 177 and 178 are based upon the recommendations of the Joint Committee on Definitions and Standards.

No. 179 changes the exemption of small packages from those containing 2 ounces or less to those containing one-half ounce or less. This was done to prevent, in so far as existing legislation will permit, deception through the slack filling of small packages, such as 5 and 10 cent packages of spices. To protect the consumer more fully than is possible under existing statutes from fraud through the slack filling of packages, or the use of containers deceptive as to the amount of food in them because of their shape or dress, the department has recommended to Congress an amendment to the Food and Drugs Act. Moreover, independently of or in connection with other charges, consideration has been given to more than 1,000 cases alleging that the net weight either was not stated on the package or else was wrongly stated. Also numerous investigations have been undertaken to determine the variation in the quantity of the contents of packages of food as the result of the process of packing, as well as from shrinkage in storage and transportation. Such investigations are necessary for the effective enforcement of the net weight amendment.

A very extensive investigation, conducted through two seasons in various sections of the country, to determine the proper fill of cans of fruits and vegetables was carried to a successful conclusion. Based upon the results of this work, announcements of weights which are representative of properly filled cans have been

made in the case of peas, unpitted cherries, wax and refugee beans, and peaches.

Food Inspection Decision 180 removed from the list of permitted colors certain ones which had been found unsuitable.

The number of pounds of straight dyes for which certification was asked during the year is as follows: Amaranth, 36,753; Butter Yellow, 3,802; Butter Yellow AB, 333; Erythrosine, 732; Indigo Disulfo Acid, 1,317; Light Green SF Yellowish, none; Naphthol Yellow S, 905; Orange I, 17,142; Ponceau 3 R, 11,832; Sudan I, 2,041; Tartrazine, 38,295. Certification was also asked for 4,750 pounds of re-packed straight dyes and 97,241 pounds of color mixtures.

Table 2 gives the distribution of the official samples examined by the various field stations. In addition, thousands of shipments were examined, hundreds of which involved a preliminary laboratory examination not reported in the table.

TABLE 2.—*Report of field stations for year ended June 30, 1919.*

Station.	Import samples.				Interstate samples.			Miscellaneous samples.	Total samples analyzed.	Hearings.	
	Legal.	Illegal.	Released without prejudice.	Floor inspection samples.	Legal.	Illegal.	Check analysis.			Personal.	By correspondence.
Central district:											
Chicago.....	140	52	39	212	214	504	159	2,819	3,888	50	380
Cincinnati....	64	1	0	20	121	294	16	261	757	0	259
Kansas City...	0	0	0	0	3	23	0	23	41	1	83
Minneapolis...	55	23	0	68	50	135	36	450	749	19	65
New Orleans...	15	18	0	59	24	66	39	896	1,052	51	202
St. Louis....	9	28	0	14	87	281	35	738	1,181	85	226
Total.....	283	122	39	873	499	1,303	285	5,187	7,668	206	1,215
Eastern district:											
Baltimore....	70	10	0	0	129	350	5	723	1,287	3	157
Boston.....	142	102	0	3,586	38	149	6	390	827	89	85
Buffalo.....	140	287	0	289	57	75	0	213	772	221	81
New York....	2,538	1,329	94	5,801	252	527	21	1,996	6,757	394	784
Philadelphia...	73	31	0	454	46	171	2	193	509	27	94
Porto Rico...	201	422	9	554	0	10	0	132	674	415	8
Savannah...	65	3	5	1	101	252	8	381	826	11	117
Total.....	3,229	2,184	108	10,685	623	1,584	42	4,028	11,652	1,160	1,326
Western district:											
Denver.....	3	13	0	84	37	91	4	486	634	3	27
San Francisco...	177	297	9	9,760	49	150	23	1,995	2,700	297	90
Seattle.....	136	237	6	6,260	48	89	13	1,211	1,750	194	61
Total.....	316	547	15	16,104	134	330	40	3,692	5,084	494	178
Grand total....	3,828	2,853	162	27,162	1,256	3,167	367	12,907	24,404	1,860	2,719

A great deal of assistance has been given the Post Office Department in connection with the exclusion from the mails of patent medicines, alleged therapeutic devices, and similar materials, involving work on the part of the bureau very similar, so far as laboratory operations are concerned, to that carried on in the enforcement of the Food and Drugs Act.

IMPORTED FOODS AND DRUGS.

During the fall of 1918, and particularly the three or four months following the signing of the armistice, owing in part to embargoes

and to the restriction of imports by the War Trade Board, imports were rather less in volume than at any other previous period. This was more noticeable in the case of food products than in the case of crude drugs, which have been less restricted and have been shipped from original sources to a greater extent than formerly. Disorganization of trade and of shipping, giving rise to delays, has caused many shipments to arrive in a more or less moldy condition. As a result of this disorganization, goods have been shipped before they were properly cleaned, particularly fennel, anise, cumin, caraway, fenugreek, and ajowan seeds, and thyme, savory, sage, and marjoram leaves, which in most instances have been released after proper cleaning. Goods in part moldy have been released after proper sorting and conditioning when this was practicable. A number of shipments of gum karaya, a product recently imported in large quantities, have been released after proper cleaning to remove excess bark or dirt. A chemical method was developed this year for the examination of this gum after grinding and conditioning. Not a few shipments of anise seed have been detained because they were mixed with an appreciable percentage of exhausted seed. In a few instances the poisonous leaves of *Coriaria myrtifolia* have been found in marjoram leaves. Substitution of crude drugs for others better known or for official species has not been uncommon. The following may be noted: Japanese aconite (*Aconitum fischeri* Reich.) for aconite (*Aconitum napellus* L.; red Jamaica or native Jamaica sarsaparilla (*Smilax utilis* Hensley) and the common brake (*Pteris aquilina* L.) for sarsaparilla; *Inula* species and an unidentified product from Mexico for arnica flowers (*Arnica montana* L.); Mexican orizaba root (*Ipomoea orizabensis* Leden.) for jalap (*Exogonium purga* Benth.) and for scammony (*Convolvulus scammonia* L.); Asiatic licorice (*Glycyrrhiza uralensis* Fisch.) for licorice; *Ballota hirsuta* Benth. for horehound (*Marrubium vulgare* L.); Egyptian henbane (*Hyoscyamus muticus* L.) for henbane (*Hyoscyamus niger* L.); *Arum maculatum* L. for *Colehicum autumnale* L.; Egyptian stramonium (*Datura metel* L.) for stramonium (*Datura stramonium* L.); *Ionidium* species for ipecac (*Cephaelis ipecacuanha* Rich.). Maracaibo bark was invoiced as cinchona bark, Peruvian bark, and cascarilla bark.

In other instances official drugs, such as aconite, belladonna, calisaya bark, and hyoscyamus, have been found deficient in alkaloid or active principle. In the case of substitutes or drugs deficient in active principle which may have some legitimate use, the bureau has felt that release on relabeling alone would not effectively prevent the goods from filtering into the channels of trade and being sold ultimately as the official product. A public statement through the service and regulatory announcements has therefore been made that release in such cases will be conditioned not only on proper relabeling but also on definite information that the goods will be manufactured by a specified firm into products for which their use is approved.

Special attention has been given to medicinal preparations bearing statements of therapeutic or curative effect. The printed matter used with each preparation has been carefully reviewed by the bureau's medical staff in Washington, with a view to exhibiting a uniform and consistent attitude toward all such products. Copies of the comments made, with information regarding the labeling,

have been transmitted on cards to all the port stations, thereby insuring perfectly uniform action. A distinction has been made between products intended for sale to the general public and those intended for physicians' use which are so labeled as not to affect the general public, properly confining all statements as to therapeutic use to an inclosed circular, leaving the outside label entirely free from such statements.

During 1918 many shipments of dried-egg products, yolk and albumen, coming from China, were found to contain notable quantities of zinc or zinc compounds. Such contamination occurred because these products were dried in zinc or zinc-lined trays, or, in some instances, in large plants, on zinc belts. During 1919 the shipments of yolk, some of them representing large lots manufactured by the spray process, have been found practically free from zinc. In the early part of the year several shipments of albumen were detained because of the presence of zinc, but during the latter part of the year a number of shipments, mostly small in amount but from a number of different manufacturers, have been found satisfactory. This would indicate that several firms in China have so changed their methods of manufacture that they can supply goods free from zinc, and will shortly be able to meet the demand for dried egg albumen and yolk, used in increasing quantities by bakers and manufacturers of bakers' supplies.

The last few months of the year saw the beginning of the resumption of normal trade in foods, notably olive oil, which had been subject to embargo in most countries. Large quantities, almost sufficient for normal demand, have come from Spain, and have caused the price to drop to nearly normal figures. In the past, Spain has furnished directly comparatively little olive oil to this country. The bureau's inspection has shown no instances of adulteration. The first few shipments have also been received of those particular foodstuffs from England, France, and Italy, that normally are imported in large quantities, but which ceased to come in during the last two years of the war. The first shipment of Smyrna figs received since the war began arrived during the last month of the year.

SUGARS, SUGAR DERIVATIVES, SIRUP.

Processes for the preparation of the sugar xylose, of gum industrially valuable as an adhesive, and of other useful substances from corncobs have been patented and made available to the public. Development work now being performed upon these processes offers a prospect that in time a new industry utilizing corncobs, a by-product heretofore largely wasted, may be established. As such an industry would make xylose available in large quantities, studies on the utilization of this hitherto rare sugar have been undertaken. A relatively simple process for its conversion into gulonic lactone, which might be useful commercially, has been patented and published. Moreover, a large series of bacteria has been found capable of fermenting xylose, to form certain products which may be of value industrially.

Data on the occurrence of the rare sugar melezitose in a manna from the Douglas fir and on the crystallography and optical properties of three aldopentoses have been published. Papers upon the

crystallographic properties of melezitose, upon the amide of α -*D*-mannoheptonic acid, and upon the rotatory powers of the amides of several α -hydroxy acids of the sugar group are in press.

The distribution of pure sugars, especially for use in bacteriological research, was more extensive this year than heretofore, varying amounts of 19 different pure sugars having been sent out.

The curtailment of distilling and brewing together with the war-time restrictions placed upon the consumption of sugar, seems to have stimulated the production of barley sugar or maltose, as well as that of maltose sirup. Since the extension of the uses of such material is a matter of some interest to the producer of barley, practical studies on the use of maltose sirup in candy manufacture have been undertaken. Preliminary results indicate that perhaps large quantities of maltose sirup can be employed in this way.

The project on the production of a uniform cane sirup that will neither ferment nor crystallize, which had reached such a stage that the problem was in the main how to introduce and cause to be used the processes devised in the bureau, has received a setback because yeast, necessary in these processes, is now obtainable only with difficulty. A search for substitutes for yeast has therefore been made, and preliminary results justify the hope that certain molds which can be grown easily and cheaply may form sufficient of the enzyme invertase to make it possible to use them instead of yeast for this particular purpose.

The bureau has cooperated with the Louisiana State Experiment Station in the study of the deterioration of raw sugars caused by the action of molds. In the preparation of cellulose acetates and their study, undertaken for the Bureau of Aircraft Production, some new cellulose compounds were prepared. This work has been closed.

FATS AND OILS.

Department Bulletin 769, "The Production and Conservation of Fats and Oils in the United States," giving a digest of the data collected during 1917 and 1918 by the U. S. Food Administration and the Bureau of Chemistry, was issued. This is perhaps the first complete and critical survey of the fat and oil industry and traffic of any country, and as a consequence the demand for the bulletin has been very great. A supplement containing the revised statistics up to January, 1919, is now in press. Hereafter the Bureau of the Census will collect the production, importation, and exportation figures on fats and oils, and issue them in quarterly reports.

The examination of tomato-seed oil has been completed, and the data thus secured submitted for publication.

A survey of the industrial recovery of wool grease has demonstrated clearly the necessity for a systematic investigation, to the end that less of this valuable material be wasted in the process of scouring wool.

CHEMISTRY AND NUTRITIVE VALUE OF PROTEINS.

The physico-chemical examination of gelatin has led to the publication of two articles entitled, respectively, "The Mutarotation of Gelatin and Its Significance in Gelation" and "The Effect of Hydrogen Ion Concentration on the Liquefaction of Gelatin," and to the

preparation of a third, entitled "Determination of the Jellying Power of Gelatins and Glues by the Polariscope," which proposes a method for testing gelatins and glues based upon changes in rotatory power.

The basic amino acid, lysin, which is believed to be an essential ingredient of diets capable of supporting growth, was discovered in hordein, the principal protein of barley.

A summary of the work on the proteins of the peanut and a preliminary announcement of the value of peanut flour in wheat bread has been presented. A loaf made from wheat flour with a small admixture of peanut flour and salts furnishes a diet that is biologically complete, is properly utilized by animals, and maintains normal growth. Even smaller amounts of soy-bean meal will give similar results.

The hydrolysis of stizolobin, the globulin of the Chinese velvet bean, *Stizolobium niveum*, has been completed. Two and one-half per cent of hydroxyglutaminic acid and from 9 to 10 per cent of aspartic acid were obtained from it. Rats fed upon a diet containing as the sole source of nitrogen the protein of the Georgia velvet bean grew normally to maturity. Further work is necessary to determine why the bean itself does not sustain growth. As has long been known, the globulin of the navy bean will not support normal growth. The bureau has discovered that if cystine be added to such a diet this protein will support growth. Moreover, normal growth can be obtained upon a diet containing navy beans to which cystine has been added. It also appears that the nutritive value of the globulin is somewhat improved by heating the protein in water. These observations are so suggestive that similar work upon other species of beans will be begun to determine if they, too, are deficient in cystine.

The data showing that coconut globulin contains all of the basic amino acids necessary to growth and that it, as well as crude coconut press cake, is capable of supporting growth, have been presented. It was subsequently found that mixtures of certain corn feeds with coconut press cake produce normal growth, which indicates that the coconut press cake contains sufficient water-soluble vitamine when the diet consists of equal amounts of the corn feed and the press cake. These findings justify the opinion expressed in the Report of the Chemist for 1918 that it is extremely desirable to retain in this country the copra-crushing industry which developed during the war.

SEA FOODS.

Bulletin 740, "A Study of Some of the Chemical Changes Which Occur in Oysters During Their Preparation for the Market," has been issued. It has been discovered that zinc, like copper, is invariably present in oysters, and probably in other mollusca. No relation could be traced between the zinc content of oysters and that of the waters from which they were taken. The data upon which these conclusions are based have been published. At the request of the Bureau of Fisheries a study was made of trade-waste effluents at Bridgeport, Conn., and West Point, Va., to determine the influence of such effluents upon the production of oysters in these localities.

Analyses have been made at various seasons of Pacific coast fishes, the food value of which is not known, and the results will be pub-

lished when another season's work has been completed. Information on the preservation of Pacific coast sardines by smoking has been disseminated, and a publication on the preparation of salacchini will soon appear. The project to develop methods for the preservation of Pacific coast fish will be discontinued because funds are no longer available.

Bacteriological examination has shown that, as reported last year for Maine sardines, and published this year, the intestines of salmon and certain other fish that are not feeding are practically sterile. Evidently in the spoilage of such fish the bacterial invasion is from the skin inward, not from within the gut outward. Hence knowledge of the resistance offered by the skin of various kinds of fish to invasion by bacteria is of importance in determining the best methods of handling each species. Preliminary data indicate that the skin of different species varies appreciably in this respect. It follows, moreover, that in handling and transporting many kinds of fish it is of the utmost importance to avoid any injury or bruising of the skin.

The changes that take place in the flora of fish during shipment to market or cannery and during cold storage have also been studied, especially the microorganisms found on Pacific salmon. A related inquiry upon an aerobic spore-forming bacillus from canned salmon has been prepared for publication. In addition, search has been made for satisfactory chemical methods to detect spoilage of salmon, and to learn the conditions under which the fish may become stale in the cannery before being packed. While satisfactory progress has been made, at least another year will be required for the completion of the project.

A paper on the determination of the hexabromid and iodine values of the oil of salmon as a means of identifying the species in the canned product has been published.

Progress has been made in the study of the best methods of transporting fresh fish. Some shippers have been induced to substitute for barrels used as shipping containers 100-pound boxes, 30 inches long by 15 inches wide by 15 inches deep. In such boxes the lower layers of fish are not subjected to as much pressure and bruising as in barrels or when shipped loose with ice in the bottom of refrigerator cars. Study has shown that in barrels the pressure upon the lower layer of fish may be so great as to produce a shrinkage of over 8 per cent in five days, whereas the shrinkage in the top layer is practically negligible.

Studies have also been made on the chilling of fish to prevent their rise in temperature while being transported in warm climates to the refrigerator. The preservation of fish by freezing, and especially the freezing of fish in chilled brine, has been investigated. It was determined that in the latter process the brine penetrates through the skin for a short distance.

A large fund of information concerning the commercial handling of fish intended for freezer storage, and on the equipment of fish freezers has been obtained. It has thus been possible to give advice to operators and prospective builders of fish freezers. Many persons in the various branches of the fish industry were given information. Producers on the Maryland, Virginia, North Carolina, and Florida coasts were instructed in the packing of fish and loading of refriger-

ator cars. In cooperation with the Bureau of Fisheries, the bureau supervised the handling and freight transportation of fish in car lots from the producing section in Florida to Savannah, Ga., Louisville, Ky., Nashville, Tenn., and Indianapolis, Ind. Approximately 400,000 pounds of fish were transported in this way, and in consequence the market for Florida fish was greatly extended. Moreover, in cooperation with the Bureau of Fisheries, analyses of various kinds of salt were made to determine the characteristics of those most suitable for salting fish.

POULTRY AND EGGS.

The following publications have been issued: Department Bulletin 391, "Accuracy in Commercial Grading of Opened Eggs;" Department Bulletin 702, "Efficiency of Commercial Egg Candling;" Department Bulletin 775, "Commercial Preservation of Eggs by Cold Storage;" and Department Circular 25, "Points for Egg Buyers."

A material diminution in the breakage of eggs during transportation resulting from faulty loading and stowing of freight cars was brought about through cooperation with the Railroad Administration. Employees of the Railroad Administration were detailed to the Bureau of Chemistry, where they received instruction in proper methods of loading and stowing eggs in freight cars. Whenever cars were received at terminals with the loads in a badly damaged condition, these employees of the Railroad Administration paid personal visits to the shipper for the purpose of instructing him how properly to load cars and avoid more damage in future shipments.

DAIRY PRODUCTS.

Much attention has been given to the development of analytical and microscopical methods for distinguishing from fresh milk remade milk, produced by combining mechanically skim-milk powder, water, and butter fat. No wholly satisfactory microscopic method has been devised. Physico-chemical methods have been found successful only under certain conditions. Physiological analytical methods have also been successful under some conditions, but it still remains to be determined whether any of these methods or any combination of them will prove universally applicable.

An extensive investigation designed to furnish information for use in the enforcement of the Food and Drugs Act has been undertaken to develop methods for the detection of spoilage in cream and butter. The flora of the various types of old cream, the products of the action of microorganisms that may be present in such cream, the effect of neutralizing and pasteurizing it before churning, the production of butter from it, and the possible occurrence of the products of the metabolism of microorganisms in the butter are being studied. This investigation is conducted mainly in the field, in cooperation with the creameries. As such work can be done in a satisfactory manner only during a portion of the year, it is probable that it will be necessary to continue it through several seasons.

BEVERAGES.

An article entitled "Composition and Food Value of Bottled Soft Drinks" was published in the Department Yearbook for 1918.

The work begun last year upon the substitution of other sweetening agents for sugar as a means of sugar conservation was continued. Three articles on the subject, published in the trade journals during 1918, were widely copied. Three other articles were added this year, "Refiners' Sirup for Bottlers," "Soft Drinks without Sugar," and "Substitute Sirups for Soft Drinks." With the cooperation of the United States Food Administration, many thousands of copies of a brief résumé of the subject were distributed, and the information given in person at meetings of the trade. A valuable service was thus rendered the soft-drink industry, and many bottlers who were unable to secure sugar were saved from disaster. Some of the substitutes proved to have such merit that they probably will remain in permanent use.

Studies have been conducted upon soda flavors and upon the flora of sweetened nonalcoholic beverages. An article has been prepared upon the longevity of bacteria in commercial bottled water.

CITRUS BY-PRODUCTS.

The citrus by-product project was organized on its present basis in 1914, the object being to develop first upon a laboratory, and later upon a commercial scale methods for the manufacture of salable products from citrus fruit not suitable for shipment as fresh fruit. Minor defects, such as small bruises or punctures from thorns, gravel, or rough boxes, destroy the shipping value of fruit, as such defects offer points for infection to various bacterial and fungous growths which cause decay. Fruit that is too small or too large, unsightly or misshapen, has also a doubtful shipping value. The amount of waste fruit averages from year to year about 3 per cent of the total crop.

The by-product laboratory at Los Angeles has been studying the utilization of cull oranges in making stable products. Marmalade, marmalade stock, juice, vinegar, and candied peel are possibilities in this direction. Methods for the production of all of these, except juice, have been developed, and either have been given to the public or are now ready for publication. Candied peel and juice of excellent quality can be made from grapefruit, and methods for their production have been devised and given to the industry.

The existing methods for the manufacture of citrate of lime and citric acid have been improved and adapted to California conditions. They are now being used satisfactorily on a large commercial scale, and while there will always be unsolved problems, as in every chemical industry, the methods of manufacture of citric acid are sufficiently well developed to permit its manufacture from the raw product at a fair profit to the lemon grower.

When these investigations were begun there were but one or two struggling by-product companies in California, which were making no appreciable inroad into the enormous supply of cull fruit available. After a few years' work and the expenditure of less than \$100,000 this situation has materially changed. Four stable, going concerns, three of them privately owned, and one a cooperative growers' company, are now manufacturing lemon by-products. The total annual manufacturing capacity of these plants is over 1,500,000 pounds of citric acid, over 500,000 pounds of citrate of lime, and over 50,000 pounds

of lemon oil. Some 20 concerns may be said to be producing orange by-products on a considerable scale. The products consist largely of marmalade, about 50 per cent of which is produced by one cooperative company. Marmalade stock, jellies, and candied peel are also being made in smaller quantities. The total output of orange by-products for the present year will approximate 6,000,000 pounds. Proof of the advance which has been made since this project began is the increase in the price of cull fruit. Less than five years ago cull lemons could be had in large quantities at \$5 a ton; to-day advertisements appear in several agricultural papers offering from \$20 to \$25 a ton for the same material, in face of the fact that a larger quantity is now available. The same situation exists in the case of oranges. In former years \$5 would buy a ton of sound cull oranges; the price at the present time for sound culls is from \$20 to \$30 a ton.

The by-product laboratory has been in close touch with a great majority of the by-product manufacturers, advising them as to processes and assisting them in every possible way in establishing their business. No small amount of good has been accomplished in pointing out defects in proposed methods of operation, and much money and time has thus been saved investors and experimenters in this field.

Work upon the production of citrus by-products was also done in Florida during the year, and it is proposed next season to prosecute the Florida part of the project vigorously.

DEHYDRATION OF FRUITS AND VEGETABLES.

The special appropriation for dehydration did not become available till late in the fall, when the production of fruits and vegetables is small. The work that could be undertaken was therefore somewhat limited, and in consequence a considerable proportion of the funds available was not used. During the war a number of plants were constructed by private enterprise to dry fruits and vegetables for military purposes, but the majority of the products, while nutritious, were unattractive and inferior in quality. The bureau endeavored to investigate all the processes in use, in the hope of suggesting improvements whereby satisfactory dried fruits and vegetables might be produced, and a sound, permanent industry established. To this end all the larger plants were carefully inspected, and their processes studied under commercial conditions. Numerous conferences were held with manufacturers, all of whom exhibited eagerness to cooperate and to offer every facility to promote the work. Laboratory investigations were undertaken to compare the nutritional qualities of dried products with those of canned and fresh material. About 30 departments of home economics, mostly in the agricultural colleges, cooperated, thus making it possible to reach conclusions more speedily than could have been done had the work been confined to a single laboratory. Studies on the nutritional value of dried products were also undertaken at Johns Hopkins University and at the University of Rochester. On the whole, the findings have been quite favorable.

Studies have also been made to determine the best conditions for the storage of dried products, especially the most suitable types of containers, and an investigation of the flora of such products is in

progress. Bulletins bearing on the various phases of the dehydration work, now in preparation, should appear during the coming year. Two general addresses by those in charge of the work have been published, one of them as Office of the Secretary Circular 126, "Relation of Dehydration to Agriculture." The net result of the work has been of real practical assistance to the industry. Poor materials are disappearing from the market, and a few plants producing materials of excellent quality have become established.

In cooperation with a plant in South Carolina, an attempt was made by the bureau to produce sweet potato flour by the methods used with success in the production of white potato flour. The plant was operated for a few months, but the results were disappointing because of the very hygroscopic nature of the product which influenced unfavorably its keeping quality. The data will be published. The bureau has also been able to assist in the establishment of the white potato flour industry, which seems to be gaining ground. Data on potato flour and potato bread have been published.

Cooperation with the potato starch industry is in progress, looking toward the utilization of potato pomace, improvement of the methods for drying starch, the production of potato dextrin, and an increase in the capacity of the plants. Assistance was given to the Office of the Quartermaster General in the inspection and supervision of plants producing dehydrated vegetables for the Army.

FLOUR AND CEREALS.

Department Bulletin 701, "The Chemical Analysis of Wheat-Flour Substitutes and of the Breads Made Therefrom," has been issued, and a paper on the composition and baking value of the different sized particles of flour is in press.

As it was proposed during the year to import from Australia wheat badly infested with weevils, experiments were performed to determine the degree to which wheat may be heated in the attempt to destroy the weevils without affecting the quality of flour produced from the treated wheat. It was found safe to heat to 160° F., but not to 180° F., for 30 minutes.

Rice is one of the flour substitutes employed during the war which promises to continue to be used in baking. Baking experiments, therefore, were made with flour prepared from different varieties and grades of rice, polished to varying degrees. Fifteen per cent of rice and 85 per cent of white flour were used. No appreciable differences were found in the baking qualities of such mixtures, irrespective of the fineness of the rice flour used. As was to be expected, the color of the bread was influenced by the degree to which the rice had been polished.

Much attention has been given to the study of the spoilage of corn meal, with a view to determining the most suitable conditions for its storage. The spoilage produced by different organisms and the effect of the growth of such organisms on the composition of the meal, especially with relation to acidity and rancidity, have been investigated, in the hope that a sound basis may be found to estimate the degree of spoilage of corn meal and its fitness for food.

GRAIN MILL, ELEVATOR, AND COTTON GIN EXPLOSIONS AND FIRES.

The emergency demonstration campaign, conducted in cooperation with the Bureau of Markets, to conserve grain and flour by preventing explosions and fires was carried out in the manner described in the Report of the Chemist for 1918. Five thousand six hundred plants were visited and over 30,000 pledge cards signed by the owners, operators, and employees. A number of recommendations suggested to the companies as possible precautions against dust explosions were cheerfully adopted, and it is believed that these slight changes have assisted in reducing the loss in this country due to explosions and fires in mills and elevators. Not a serious explosion occurred in such a plant during the year. A very disastrous explosion did occur in a different type of plant, a starch works, 43 persons being killed and a number injured. This demonstrates clearly that the work should be extended to other dusty industries. As no funds were available to proceed with the work after the close of the fiscal year, and as the U. S. Grain Corporation desired that it be continued as a form of insurance for its own operations, arrangements were made to transfer the force engaged upon this campaign to the rolls of the Grain Corporation. The work will be continued by that corporation, the Bureau of Chemistry collaborating by furnishing general supervision.

The campaign to prevent explosions and fires in thrashing machines has been continued and extended to cover other sections than Oregon, Idaho, and Washington, to which it had hitherto been limited. In cooperation with the Bureau of Plant Industry and the Bureau of Markets, special attention was given to the development of the suction-fan installation to remove dust from thrashing machines, and an effort was made to determine the effect of its operation on grain cleaning and on the possibility of smut-spore collection and disposal in order to prevent the dissemination of the spores over surrounding land. Plant pathologists have expressed themselves as quite hopeful that the devices for the disposal of spores which have been designed and tested may prove of great service in the control of the smut of wheat.

The discovery that many of the fires in the cotton gins of the Southwest are due to static electricity reported last year was confirmed this year. The limited funds available made it necessary to confine this work, which was done in cooperation with the Bureau of Markets and the various State and insurance agencies, almost entirely to the State of Texas. Department Circular 28, "Cotton Gin Fires," issued during the year, was distributed among cotton ginners, insurance agencies, and others interested throughout the South. Though still unfinished, the work was closed at the end of the fiscal year, no appropriations being available thereafter.

DRUGS AND PHARMACOLOGY.

A series of researches upon crude drugs have been published under the following titles: "Commercial Viburnum Barks and Preparations;" "Karaya Gum, a Substitute for Tragacanth;" "*Ballota hirsuta* Benth., an Adulterant of Horehound (*Marrubium vulgare* L.);" "Piptostegia Root, *Piptostegia Pisonis* Mart, so-called Brazilian

Jalap;" "Botanicals of the Blue Ridge;" "*Conium maculatum* L., and *Aethusa cynapium* L., an Adulterant;" and "So-called Syrian Alkanet, *Macrotomia cephalotes*, D. C." Manuscripts have been submitted for publication under the titles: "*Santolina chaemacyparissus* L., an Adulterant of *Matricaria chamomilla* L.;" "The Structure of Bermuda Grass Compared with that of Triticum;" and "Some Effects of the War upon Crude Drug Importations."

Evidence has been obtained that the part of ipecac which is often referred to as "stems" consists largely of the underground part of the axis, more properly referred to as rhizome. The young and smooth roots at times may also be considered as stem, since they resemble the rhizome rather closely in appearance. These parts, evidently referred to by mistake as stem, were found to contain appreciable quantities of ether-soluble alkaloids. It appears quite probable that the problem concerned with the utilization of this now rejected but valuable part of the ipecac plant can be solved by modifying the definition for ipecac to read: "The dried roots and rhizomes * * *"

The optical crystallographic properties of the cinchona alkaloids have been determined, so that a new method for their identification, even when present in small amounts if they can be obtained in crystalline form, is now available. An inquiry into the occurrence of lead in pharmaceutical zinc oxid has been published. A paper upon the preparation of sodium-p-hydroxyphenyl-arsenate, an intermediate in the manufacture of arsphenamine, and one entitled "A Review of the American Patent Literature on Arsphenamine (Salvarsan) and Other Arsenicals" have been issued.

A new method for determining the toxic effect of various agents administered over long periods of time in small dosage has proved of service. Young rats are placed upon such a standard, adequate diet as has been introduced by Osborne and Mendel and by McCollum. To the diet the substance under investigation is added, and the growth curve of the young animals plotted. Disturbances of health usually become evident when such growth curves are compared with those of normal animals. It is hoped that by this method it may be possible to determine the lower limit of toxicity of many substances. Such an investigation upon cadmium, which during the war it was proposed to substitute in part for tin in solder and other alloys, has been completed.

An extensive study on the toxic action of gossypol, a phenol found in cotton seed, to which the poisonous action of some cottonseed meal has been attributed, is in progress. Complete information on this subject is necessary, in view of the recommendations now being made by various dietitians that cottonseed meal be used as food for man. The optical crystallographic properties of gossypol have been determined.

The description of a transparent celluloid renal oncometer or plethysmograph has been published.

The services of the bureau's experts were furnished the scientific division of the Shipping Board and the Tariff Commission, in connection with the consideration of drug and chemical products.

PLANT CHEMISTRY.

Seeds of about 40 individual plants of the mustards, *Brassica cernua* and *Brassica juncea*, grown in Illinois, have been examined

separately for essential oil. In general, the volatile oil content of these seeds was much above the average, reaching in some cases 1.5 per cent. Seeds of the varieties from which the largest yields of oil were obtained have been planted at Arlington, Va., for further study. Under the title "Capsaicin, the Pungent Principle of Capsicum," the results of the study of the constitution of the pungent principle of red pepper have been published. It has been possible to produce synthetically a series of substances of marked pungency.

A report on the results of a survey on the caffeine content of the North American species of the genus *Ilex*, under the title "*Ilex vomitoria* as a Native Source of Caffeine," is in press. Of the various species examined, only *Ilex vomitoria*, used since prehistoric times by the Indians for the preparation of a beverage, was found to contain caffeine.

Department Bulletin 773, "Chemical Analyses of Logan Blackberry (Loganberry) Juices," has been issued.

To further the educational campaign to improve conditions in the production of tomato products, which has been conducted for some years, a paper on "Factory Investigations on the Manufacture of Tomato Pulp and Paste" was printed in a trade journal.

Articles upon the determination of the distribution of nitrogen in certain seeds, upon the reduction of nitrates by seedlings, and upon the effect of lime upon the alkali tolerance of wheat seedlings have been published. Studies of pumpkin and squash seed have been completed.

At the request of the Bureau of Plant Industry, the acidity of the soil under certain special conditions was investigated.

For the Bureau of Biological Survey many samples of water from North Dakota lakes were examined to obtain information regarding the propagation of aquatic plants.

In cooperation with the Bureau of Markets, an extensive survey is being made on the composition of cotton seed from various sections of the country. In addition to the analyses made in the bureau, 60,000 analyses have been obtained from 27 other laboratories, and arrangements to obtain from these laboratories similar analyses of the 1918 crop have been completed. Studies begun some years ago to determine whether the oil content of a given sample of seed could be estimated from the density of the seed, or the weight per thousand, and the like, factors of worth in the evaluation of barley, have not yielded results of value.

FOOD FLORA, SPOILAGE, AND FERMENTATION.

References to the year's work upon the spoilage and the flora of specific articles of food are made elsewhere in this report, where such foodstuffs are specifically considered. The general investigations upon poisoning by spoiled food have been continued, and some of the results embodied in two papers entitled, respectively, "Toxin Formation by a Variety of *B. botulinus* when Cultivated Aerobically under Various Conditions: Its Possible Production in the Animal Body," and "Botulism from Canned Asparagus." In general, the results indicate that the strain of *Bacillus botulinus* isolated from the spoiled asparagus which produced fatal poisoning is capable of withstanding the temperature used in the processing of canned goods by methods in vogue for home canning or for commercial canning, that

the organism produces putrefactive decomposition, and that the principal safeguard against poisoning from such types of organisms as this lies in the scrupulous examination of every can of material to make sure that no spoiled food is included in the portions eaten.

The study of the molds used in the oriental fermentation industries has included several lines of experimentation. Soy sauce has been made according to the methods employed in Japan. Enzymic studies have been performed with a bran koji made with *Aspergillus Wentii* and various strains of *Aspergillus flavus*. The metabolism of this group of organisms has been studied, especially the chemical changes they produce in soy fermentation, and the formation of phenolic substances. A study of Chinese red rice as produced by the growth of *Monascus purpureus* has been prepared for publication under the title of "Laboratory Experiments on the Manufacture of Chinese Ang-khak in the United States."

In connection with the studies to improve the manufacture of pickles and prevent the losses that occur at present because of the softening of the pickles during storage, arrangements have been made with the Bureau of Plant Industry and with the Mississippi Agricultural College to study the fermentable sugar content of different varieties of cucumbers. Cooperation has also been maintained with manufacturers of sauerkraut, with a view to controlling the temperature of the kraut as it goes into the fermenting vat, in order to obtain more nearly the optimum conditions of fermentation than has hitherto been the case. A report on the use of pure culture starters in the preparation of sauerkraut has been issued. The work on the preservation of foods by fermentation and brining has been continued, and the information of value thus obtained has been transmitted to the States Relations Service for demonstration in the field. A report of the work is in manuscript form. A paper entitled "A Preliminary Report upon Some Halophilic Bacteria" has been printed.

The requests for cultures from the bureau's extensive and growing collection have been numerous, centering, in recent years, upon the citric-acid-forming group of molds, the cheese-ripening fungi, and those connected with the oriental fermentation industries. Many routine identifications of cultures were made for various investigators.

A communication was made upon the chemical analyses of bacteriological bouillons.

INSECTICIDES AND FUNGICIDES.

Department Bulletin 750, "A Method for Preparing a Commercial Grade of Calcium Arsenate," and a communication on plants used as insecticides, have been printed, while a paper describing the diagnostic characters of the field daisy, used as an adulterant of pyrethrum, is in press. Equipment to produce insecticides and fungicides on a semicommercial scale has been secured, to the end that ways and means to improve manufacturing processes and to devise new types of useful insecticides and fungicides may be investigated. In cooperation with the Bureau of Entomology, the possible value of war gases as insecticides has been taken up. Phosgen and cyanogen chlorid have been studied. The field men of the Bureau of Entomology have been assisted in the work of controlling the boll weevil.

CONTAINERS.

The bureau was invited to designate a representative to serve upon the Committee on Standard Specifications for Kitchen Ware, Mess Equipment, and Flat Ware for the Army. This led to the examination of 61 samples of enamel ware from 26 different American manufacturers. The test most frequently used was made by boiling 500 cubic centimeters of 4 per cent acetic acid, the strength of standard vinegar, in the vessel for half an hour. No antimony was dissolved from 17 samples obtained from 9 manufacturers. Thirty-four vessels, both white and gray ware, yielded to the solution from 0.5 to 2.0 milligrams of antimony. Lead was found in ware from only one manufacturer. Earthenware was then examined, and in some instances its glaze was found to yield to the acetic acid solution small amounts of lead.

Analyses have been made for the War Department and the War Industries Board of foil used to wrap food products and other materials. Some foil is pure aluminum, some is pure tin, while some contains lead and tin, with the tin varying from 1 to 30 per cent. Some of the composite foils appear to be alloys, while others consist of an inner layer of lead covered by two layers of tin. In most of the instances when foil containing lead is used a waxed paper wrapping is placed between the metal and the food product.

Except in the case of phosphorus matches, there are no Federal laws to protect the public against the presence of poisonous substances in articles of common use in the household. Many foreign countries have long had such legislation on their statute books.

Cooperation with the industry to ascertain what types of tin plate are most suitable for food containers has been continued. Special attention is being given to the best means of preventing the perforation of cans containing acid fruits. The results of the successful trial in a tin mill under ordinary conditions of hydrogenated oils in place of palm oil have been prepared for publication.

A paper dealing with the use of the impact tester for fiber board has been presented, and work was continued on the improvement of the water-resisting properties of fiber board for fiber containers, both by substituting other adhesives for silicate of soda and by using external treatments which will not interfere with the future use of the stock. A report on the various kinds of water-resistant baling papers was given.

COLOR INVESTIGATIONS.

The general plan of the color investigations which have been in progress in the bureau for but a few years was first fully discussed in the Report of the Chemist last year. This year it is possible to report specific results.

Work upon photosensitizing dyes was begun at the instigation of the War Department. The three important sensitizing dyes, pinacyanol, pinaverdol, and dicyanin, have been prepared and made available. Preparations of these dyes have been distributed to those requiring them, including photographic plate manufacturers and astrophysicists, who have reported them satisfactory. A new dye showing absorption further in the infra-red part of the spectrum than any other known dye has been prepared. It may prove of great value to

physicists. New processes for the manufacture of these photosensitizing dyes have been discovered and patent applications filed. Four papers upon the chemical properties of and the methods for producing these dyes and their intermediates and one upon their crystallographic and optical constants have been published. As it is now possible to establish in the United States this very small but scientifically extremely important branch of the dye industry, steps to bring this about are being taken.

The new method developed in the bureau for the production of phthalic anhydrid by catalytic air oxidation is in successful commercial use, and cooperation was begun with another manufacturer during the year. Certain theoretical laboratory investigations remain to be completed before a final report of the whole investigation can be published.

From cymene a new photographic developer has been produced and the process published. Studies upon the chlorination of cymene are in progress. A report upon the preparation of 2-chlor-5-6-dinitrocymene is ready for the printer.

The sulphonation studies have progressed to such a point that cooperation with the industry upon the sulphonation of benzene has begun. Observations of great interest, especially on the sulphonation of naphthalene, are in process of investigation. Reports have been prepared upon "Some Difficultly Soluble Salts of Certain Naphthalene Sulphonic Acids," and upon "A Method for the Qualitative Determination of Some of the Naphthalene Sulphonic Acids."

The laboratory and plant studies on the production of isopropyl alcohol and its oxidation to acetone, undertaken for the Bureau of Aircraft Production, have been completed. It seems probable that the process will prove of commercial value.

Papers have also been presented upon the following subjects: "Some Aspects of the Behavior of Charcoal with Respect to Chlorin;" "A Method for the Purification of Certain Azo Dyes;" and "The Catalysis of Some Vapor Phase Oxidation Reactions."

The laboratory under construction at Arlington for large-scale or semi-industrial operations, which was loaned to the Nitrate Division of the Bureau of Ordnance during the war, has been released to the Bureau of Chemistry and should be ready for occupancy during the coming year.

LEATHER AND TANNING.

Farmers' Bulletin 1055, "Country Hides and Skins," has been prepared in cooperation with the Bureau of Animal Industry and Bureau of Markets. Plans have been made to disseminate the information contained in this bulletin widely through the county agents of the States Relations Service, the distribution of posters, and the like, in the hope that the very great waste of valuable raw materials that now occurs because of lack of knowledge may be stopped. Papers on the waterproofing of leather, on the relative absorption of oils and greases by wet and dry leather, on the testing of materials for increasing water resistance of sole leather, and on the suitability of various solvents for the extraction of oils and greases from leather were presented at various meetings of technical societies. A farmers' bulletin on the care of shoes and harness is in preparation. Assistance has been rendered the War Department and the War

Industries Board in regard to the waterproofing of leather and the preparation of specifications for various kinds of leather, the Post Office Department on specifications for bag leather, and the U. S. Shipping Board. Methods for the tanning of alligator skins have been furnished the Indian Commission of the Interior Department, which contemplates the establishment of the industry among the Indians of Florida.

NAVAL STORES.

The final report on the production of naval stores, including gum rosin and gum turpentine, wood rosin and wood turpentine, and rosin reclaimed from batting dross, has been published, and put into the hands of producers, factors, dealers, and consumers of naval stores. This report shows the total production for the last season, stocks on hand at stills on March 1, 1919, and total shipments from stills during the period from April 1, 1918, to March 1, 1919. Reports have also been made of the stocks of rosin and turpentine in the hands of the consumers of naval stores and of the stocks in the storage yards at the principal points of distribution in the country. Assistance was given the Bureau of the Census in the preparation of the schedule for naval-stores statistics and of the lists of naval-stores producers.

Specifications on the properties, the sampling, and the laboratory examination of turpentine have been prepared and submitted to the Interdepartmental Committee on Paint Specifications for Government Bureaus. Much investigational work was required in this connection, because fresh virgin turpentine may not reach the minimum limits formerly set for specific gravity and refractive index, while turpentine taken from storage tanks in the South which have remained partly filled for a year or more may exceed the limits previously set for these constants.

In accordance with the practice of the past to place glass types for grading rosin at convenient points, a set of types has been deposited on loan with the secretary of the Chamber of Commerce of Cleveland, Ohio, for the use of consumers and dealers in that vicinity.

PAPER AND FABRICS.

Assistance in the preparation of specifications for paper has been given to the congressional Joint Committee on Printing, to the Post Office Department, and to the Treasury Department.

The study of the waterproofing, mildewproofing, and fireproofing of fabrics for farm use has been continued. A farmers' bulletin on waterproofing and mildewproofing for farm purposes, as well as an article on the general toxicity of soaps of heavy metals, alone and in combination, to fungi occurring on textiles, are in preparation. A paper entitled "Water Resistance of Fabrics" is in press.

Assistance has been given to the Office of the Quartermaster General and to the Chief of Staff of the Army on the preservative treatment of fabrics and on the repairing and waterproofing of tentage.

METHODS AND APPARATUS.

Methods have been published for the estimation of theobromin, of potassium guaiacol sulphonate, of citral, of mercury precipitated as mercuric zinc thiocyanate, of zinc precipitated as zinc mercury thiocyanate, of copper in insecticides, of zinc and copper in gelatin, of tyrosine in proteins, of the loosely bound nitrogen in eggs as ammonia, of the lower alkylamines in the presence of ammonia, of coumarin in factitious vanilla extracts, of iodine in mineral waters and brine, and of the acidity of grain extracts. Report has been made upon the use of benzaldehyde sulphite compound as a standard in the quantitative separation and estimation of benzaldehyde and benzoic acid, upon a method for the rapid analysis of mixtures of chlorinated toluene, and upon the use of thymosulphophthalein as an indicator in acidimetric titrations.

Methods are in process of publication upon the determination of bromide in mineral waters and brines, the estimation of monobromated camphor in migraine tablets, the use of kaolin in tannin analysis, the determination of water solubles in leather, the determination of caffeine, and the determination of the water resistance of fabrics. Certain other investigations upon analytical methods are referred to elsewhere in this report.

Descriptions of laboratory apparatus for rapid evaporation, and of a new type of volumenometer have been published.

The bureau's machinery for the examination of supplies purchased has been reorganized, and a paper on the general subject of laboratory apparatus was presented to the American Chemical Society.

REPORT OF THE CHIEF OF THE BUREAU OF SOILS.

MILTON WHITNEY, *Chief of Bureau.*

SOIL SURVEY.

The war did not make itself felt in a decrease of the work done by the Soil Survey before the spring of 1918. With no increase in the field staff the area covered in 1918 was greater than the year before. In 1919 the effect of the war was shown in a decreased area covered, which was a little more than 4,000 square miles less than the area covered in 1918. During the closing months of the fiscal year 1918 many members of the field staff entered the military service, reducing the effective force to about two-thirds its normal strength, at which point it was with difficulty maintained during the greater part of 1919.

Detail surveys were made during the year in 27 States. In 22 of these the work was done in active cooperation with State organizations. The area covered in these States amounted to 27,456 square miles. In five States 4,532 square miles of noncooperative work was done, the percentage of such work being slightly higher during 1919 than 1918. The total area surveyed in detail during the year was 33,988 square miles.

Reconnaissance soil mapping was confined during the year to one area in the High Plains section of western Texas. This area comprised territory of an extent of 6,085 square miles.

The total area covered by detailed surveys in continental United States up to June 30, 1919, amounted to 517,940 square miles.

The following tables give in detail statistics covering the operations for the last year and also a summary statement of the area surveyed from the beginning of the work in 1899 to date.

Notwithstanding the fact that the work of the Soil Survey is not directly concerned with production and that no funds were received from the emergency appropriation, a certain amount of work bearing on the prosecution of the war was done at the request of the War Department in connection with the constructing of the progressive military map of the United States. In large areas of the Coastal Plain section of the United States the base maps prepared by the Soil Survey were the most reliable maps in existence. All of the published maps of this region were used by the War Department and the base-map information contained in unpublished soil maps was compiled and turned over to the Corps of Engineers. In addition to this the areas for survey in Southern States during the winter of 1918-19 were selected, at the request of the War Department, in localities where there was greatest need of fundamental information. Placing the areas according to this plan was done in every case with the consent of the cooperating State concerned.

Individual areas surveyed and mapped during the fiscal year ended June 30, 1919.

DETAILED.

State.	Area.	Area surveyed.	
		Square miles.	Acres.
Alabama.....	Geneva County.....	257	164,480
	Houston County.....	445	284,800
	Marengo County.....	1 270	172,800
California.....	Brawley Area.....	315	201,600
	Grass Valley Area.....	12 114	72,960
	Shasta Valley.....	220	140,800
Delaware.....	Kent County.....	1 177	113,280
	Sussex County.....	416	266,240
Florida.....	Duval County.....	391	250,240
	Orange County.....	1 605	387,200
Georgia.....	Butts-Henry Counties.....	527	337,280
	Coweta-Fayette Counties.....	704	450,560
	Green - Morgan - Putnam - Oconee Counties.....	1,346	861,440
	Madison County.....	286	183,040
Idaho.....	Bannock County.....	3,179	2,034,560
Iowa.....	Fayette County.....	164	104,960
	Louisia County.....	396	253,440
	Madison County.....	563	360,320
	Madaska County.....	128	81,920
	Marshall County.....	573	366,720
	Palo Alto County.....	561	359,040
	Polk County.....	582	372,480
	Wayne County.....	1 388	248,320
	Winnebago County.....	1 296	189,440
	Wright County.....	106	67,840
Kentucky.....	Logan County.....	1 123	78,720
	Muhlenberg County.....	168	107,520
Louisiana.....	Sabine Parish.....	1 631	403,840
Maryland.....	Carroll County.....	390	249,600
	Charles County.....	464	296,960

¹ These figures do not include portions of these areas surveyed in preceding years.

² Area enlarged by 114 square miles.

Individual areas surveyed and mapped during the fiscal year ended June 30, 1919—Continued.

State.	Area.	Area surveyed.	
		Square miles.	Acres.
Massachusetts.....	Bristol County.....	165	105,600
Mississippi.....	Choctaw County.....	¹ 124	79,360
	Lamar County.....	¹ 252	161,280
	Simpson County.....	575	368,000
	Smith County.....	369	236,160
Missouri.....	Chariton County.....	768	491,520
	Polk County.....	149	95,360
	Reynolds County.....	578	369,920
	St. Louis County.....	116	74,240
Nebraska.....	Banner County.....	240	153,600
	Cheyenne County.....	¹ 992	634,880
	Redwillow County.....	155	99,200
	Sheridan County.....	¹ 2,067	1,322,880
	Sioux County.....	120	76,800
New Jersey.....	Bernardsville Area.....	522	334,080
	Chatsworth Area.....	¹ 2 682	436,480
New York.....	Chenango County.....	¹ 664	424,960
	Wayne County.....	123	78,720
	White Plains Area.....	864	552,960
North Carolina.....	Moore County.....	639	408,960
	Vance County.....	279	178,560
	Wilkes County.....	¹ 273	174,720
North Dakota.....	Trall County.....	865	553,600
Oregon.....	Josephine County.....	210	134,400
	Multnomah County.....	180	102,400
	Washington County.....	731	467,840
Pennsylvania.....	Lycoming County.....	¹ 36	23,040
South Carolina.....	Greenville County.....	364	232,960
	Kershaw County.....	673	430,720
	Spartanburg County.....	285	182,400
Tennessee.....	Meigs County.....	³ 200	0128,00
Texas.....	Dallas County.....	334	213,760
	Denton County.....	¹ 267	170,880
	Erath County.....	356	227,840
	Freestone County.....	¹ 350	224,000
	Tarrant County.....	456	291,840
Virginia.....	Pittsylvania County.....	¹ 611	391,040
Washington.....	Wenatchee Area.....	600	384,000
West Virginia.....	Braxton and Clay Counties.....	849	543,360
	Webster County.....	¹ 321	205,440
Wisconsin.....	Jackson County.....	¹ 328	209,920
	Kenosha County.....	274	175,360
	Outagamie County.....	¹ 105	67,200
	Walworth County.....	112	71,680
Total.....		33,983	21,752,320

RECONNOISSANCE.

Texas.....	Northwestern Reconnaissance.....	6,085	3,894,400
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¹ These figures do not include portions of these areas surveyed in preceding years.

² Reported as Toms River Area in 1918 report.

³ 70 square miles surveyed in July, all included in fiscal year.

Areas surveyed and mapped in the several States during the fiscal year ended June 30, 1919, and the areas previously reported.

DETAILED.

State or Territory.	Work dur- ing 1919 (square miles).	Work pre- viously reported (square miles).	Total.	
			Square miles.	Acres.
Alabama.....	972	45,631	46,603	29,825,920
Arizona.....		961	961	615,040
Arkansas.....		11,934	11,934	7,637,760
California.....	649	19,229	19,878	12,721,920
Colorado.....		2,809	2,809	1,797,760
Connecticut.....		1,704	1,704	1,090,560

Areas surveyed and mapped in the several States during the fiscal year ended June 30, 1919, and the areas previously reported—Continued.

State or Territory.	Work during 1919 (square miles).	Work previously reported (square miles).	Total.	
			Square miles.	Acres.
Delaware.....	593	1, 186	1, 779	1, 138, 560
Florida.....	996	10, 815	11, 811	7, 559, 040
Georgia.....	2, 863	22, 199	25, 062	16, 039, 680
Idaho.....	3, 179	3, 109	6, 288	4, 024, 320
Illinois.....		6, 770	6, 770	4, 332, 800
Indiana.....		11, 062	11, 062	7, 079, 680
Iowa.....	3, 767	13, 185	16, 942	10, 842, 880
Kansas.....		9, 016	9, 016	5, 770, 240
Kentucky.....	291	3, 898	4, 189	2, 680, 960
Louisiana.....	631	13, 022	13, 653	8, 737, 920
Maine.....		2, 197	2, 197	1, 406, 080
Maryland.....	854	5, 934	6, 788	4, 344, 320
Massachusetts.....	165	1, 494	1, 659	1, 061, 760
Michigan.....		5, 708	5, 708	3, 653, 120
Minnesota.....		5, 301	5, 301	3, 392, 640
Mississippi.....	1, 320	23, 142	24, 462	15, 655, 680
Missouri.....	1, 611	29, 794	31, 405	20, 099, 200
Montana.....		882	882	564, 480
Nebraska.....	3, 574	18, 660	22, 234	14, 229, 760
Nevada.....		235	235	150, 400
New Hampshire.....		1, 411	1, 411	903, 040
New Jersey.....	1, 204	5, 195	6, 399	4, 095, 360
New Mexico.....		596	596	381, 440
New York.....	1, 651	17, 771	19, 422	12, 430, 080
North Carolina.....	1, 191	28, 244	29, 435	18, 338, 400
North Dakota.....	865	12, 362	13, 227	8, 465, 280
Ohio.....		10, 102	10, 102	6, 465, 280
Oklahoma.....		6, 540	6, 540	4, 185, 600
Oregon.....	1, 101	2, 679	3, 780	2, 419, 200
Pennsylvania.....	36	15, 129	15, 165	9, 705, 600
Porto Rico.....		330	330	211, 200
Rhode Island.....		1, 085	1, 085	694, 400
South Carolina.....	1, 322	20, 558	21, 880	14, 003, 200
South Dakota.....		675	675	432, 000
Tennessee.....	200	8, 725	8, 925	5, 712, 000
Texas.....	1, 763	29, 194	30, 957	19, 812, 480
Utah.....		1, 951	1, 951	1, 248, 640
Vermont.....		1, 175	1, 175	752, 000
Virginia.....	611	9, 102	9, 713	6, 216, 320
Washington.....	600	10, 152	10, 752	6, 881, 280
West Virginia.....	1, 170	14, 845	16, 015	10, 249, 600
Wisconsin.....	819	15, 408	16, 227	10, 385, 280
Wyoming.....		855	855	547, 200
Total.....	33, 988	483, 961	517, 949	331, 487, 360

RECONNOISSANCE.

Alaska.....		31, 768	31, 768	20, 331, 520
Arkansas-Missouri.....		58, 000	58, 000	37, 120, 000
California.....		32, 135	32, 135	20, 566, 400
Kansas.....		39, 960	39, 960	25, 574, 400
Nebraska.....		53, 064	53, 064	33, 960, 960
North Dakota.....		39, 240	39, 240	25, 113, 600
Ohio.....		41, 420	41, 420	26, 508, 800
Pennsylvania.....		41, 405	41, 405	26, 499, 200
South Dakota.....		41, 400	41, 400	26, 496, 000
Texas.....	6, 085	92, 297	98, 382	62, 964, 480
Washington.....		13, 115	13, 115	8, 393, 600
Wisconsin.....		14, 425	14, 425	9, 232, 000
Total.....	6, 085	498, 229	504, 314	322, 760, 960

Cooperative work with the Forest Service was carried on during the year in certain studies in Utah, Arizona, and in a number of Southeastern States. In the latter the work had especial reference to the relation of soil character to kind and character of forest growth. Information of this kind was desired in certain reforestation studies in the area of cut-over lands in the South. The work in

Utah and Arizona also was concerned primarily with the relation of the soil to the growing of forest trees.

The study of the soil conditions on the public lands, in cooperation with officials of the Geological Survey engaged in land-classification work, was continued through August, 1918, when the party assigned to this work was called for by the Reclamation Service. This work with the Geological Survey was concerned primarily with the problems of soil classification in the Great Plains States, and a great deal of valuable information concerning the soils in the region was obtained. The data will be useful in preparing a soil map of the United States upon which the bureau and the Office of Farm Management are engaged. Studies of the same character, independent of the Geological Survey, were made in southeastern Utah and southwestern Colorado, late in the season after the forest-survey work in Utah had been finished.

At the request of the Reclamation Service, Interior Department, a party was assigned to the work of examining the soils of a number of areas in Wyoming, Utah, and Arizona, with regard to the feasibility of extending a number of existing irrigation projects. This work was carried on from the middle of August until midwinter.

The bureau also assisted the Bureau of Entomology of this department in the examination of the soils of several areas in the grape-growing sections of California, where the vineyards were suffering from phylloxera.

At the request of the American Geographical Society, in whose charge was placed the work of the House Commission for the Accumulation of Geographic and Economic Information concerning undeveloped or imperfectly developed parts of the world, information relating to the soils of Africa and Asiatic Russia was compiled. A generalized soil map of Africa, based on existing literature, was prepared and transmitted to the State Department.

At the request of the State Department, a party from the Soil Survey was sent in the spring of 1919 to Central America for the purpose of making an economic survey of parts of Guatemala and Honduras. The party finished its field work and returned to Washington in June. At the close of the year considerable progress had been made in the preparation of a report covering the work done. An area of about 12,000 square miles was examined.

The African compilation and the studies made in Central America not only supplied the information desired by the institutions requesting it, but also gave results of much value to the Soil Survey.

An exhibit of the work of the Soil Survey was prepared during the early part of the fiscal year, and during September and October a man from the division, accompanied by representatives of certain other bureaus of the department, visited a number of State fairs for the purpose of presenting and explaining the work of the bureau. During the latter part of the winter a more elaborate exhibit was prepared. This was sent abroad for use in the field schools of agriculture maintained in France for the benefit of American soldiers.

Much advice and information by correspondence was given during the year. This work was heavier than usual, owing to the country-wide interest in war gardens, and involved the examination of a large number of samples of soil.

The work of studying the truck soils of the eastern United States continued during the year, with some interruptions caused by emergency calls to other work, such as the preparation of the exhibits for the fair circuits and for the American soldiers in France. The field work in the Charleston area was completed and the report prepared for publication.

At the suggestion of the Railroad Administration the preparation of a series of reports on the soils of certain of the Southern States was begun, and on June 30 considerable progress had been made on the initial report of the series.

CHEMICAL INVESTIGATIONS.

During the fiscal year 1919 miscellaneous samples from other departments, other bureaus of this department, outside institutions, and private individuals have been analyzed or examined as usual. These have included the alkali analyses of soils for the Geological Survey and the Bureau of Standards, the examination of park soils for the District government, cooperate tests of soils from the Arlington Farm for the Bureau of Plant Industry, and the examination of numerous samples of rocks, minerals, soils, etc., supposed to be of value as fertilizer.

During the earlier part of the year research work on the composition of soil types was continued, but later this was abandoned on account of the rush of war activities. After the signing of the armistice work was resumed upon this subject. The major research activities of the Chemical Division, however, have centered about the chemical and mineralogical nature of the materials extracted from soils by treatment with water. A number of minerals have been identified in these products and it has been shown that the evaporated water extract of soils leaves a residue showing considerable resemblance to the Stassfurt and other natural saline deposits. A material, provisionally called ultra clay, has also been obtained by these extractions and its properties are now being investigated. These lines of work, together with the study of the chemistry of the soil solution, now well under way, are in certain respects unique and give promise of important results.

The war activities consisted mainly of the analysis of numerous samples of zircon sands in cooperation with the Bureau of Mines, the Geological Survey, and the Bureau of Standards. For some time this work absorbed the whole attention of the division. The other direct war activity consisted of the determination of the lime requirement and the preparation of various special soils for the Chemical Warfare Section.

The head of the division, Dr. E. C. Shorey, resigned and a new head was not appointed until the close of the year. During the greater part of the year a large part of the personnel of the division was detailed to the Fertilizer Division for war work on nitrogen products.

FERTILIZER RESOURCES INVESTIGATIONS.

FERTILIZER CONTROL.

During the fiscal year 1919 the Division of Fertilizer Resources Investigations worked in cooperation with a number of other gov-

ernmental agencies on problems directly or indirectly connected with fertilizers. Until the signing of the armistice the division assisted the Office of Fertilizer Control, furnishing technical information regarding fertilizers, their sources, supply, and manufacture, and advising on many problems arising in Government control. With the cessation of active hostilities and the disbanding of the emergency organization certain phases of the work upon which the Office of Fertilizer Control had been engaged were placed in charge of the Bureau of Soils and became a part of the duties of this division.

In response to complaints of farmers of the high cost of fertilizers, an investigation was made of retail prices in the Southern and Eastern States, where practically all the fertilizer used in this country is consumed. In gathering these data the bureau was assisted by the States Relations Service, working through its county agent organization. The results, published in circulars of the department series and appertaining to conditions in the months of May and June, 1919, showed not only excessively high prices in many parts of the country, but also striking inconsistencies between the quotations of dealers in adjacent counties and even in different parts of the same county, the disparity being much greater than could be explained away on the ground of differences in freight rates.

It is believed that the publication of the information has tended to equalize prices, or at least has put the farmer on his guard and shown him that he can save much in the cost of fertilizer by judicious purchasing.

Studies of the fertilizer trade also have been concerned with existing methods of computing the cost of manufacture, of establishing wholesale prices, and of providing for distribution.

NITROGEN INVESTIGATIONS.

Work has been continued on the fixation of atmospheric nitrogen in cooperation with the Bureau of Ordnance, Nitrate Division, of the War Department. This has involved three lines of investigation: (1) The synthetic, or so-called Haber process for the formation of ammonia from hydrogen and nitrogen; (2) the preparation and use of cyanamid for fertilizer purposes; and (3) the utilization of the silent discharge at high potential for the production of nitric acid. The first of these investigations had advanced to such a stage that we were able soon after war was declared to be of considerable service to the War Department in investigating their special problems, the Arlington laboratory being put at their disposal for such purposes. In the year just closed work along all of the lines mentioned has been extended. At the invitation of the Fixed Nitrogen Research Laboratory, the men engaged in these investigations have been moved to the American University to continue the work in cooperation with the War Department.

PHOSPHATES.

Investigation of a method for the manufacture of phosphoric acid by smelting the rock and recovering the acid from its gaseous state has continued during the year. In the last report mention was made of the results achieved with a specially designed furnace of small size. This contrivance, itself the result of much experimental work, is operated with fuel oil, and possesses the advantage over the electric

furnace first tried of being much cheaper to run. Experiments with the new type of furnace are being carried out on a larger scale to determine its commercial value. If the feasibility of this method can be shown, its ultimate general adoption by the producers of acid phosphate would seem assured, for the advantages—elimination of waste in mining, production of a pure acid, and saving in the cost of hauling an immense tonnage of inert material—are manifestly too great to be ignored by those engaged in the business of phosphate manufacture.

POTASH.

Investigations of the potash resources of the country have been continued principally in connection with the recovery of the salt from flue dust and its production from kelp. Many samples of the dust from blast-furnace stacks and some additional samples from cement plants have been collected and analyzed, and the bureau sees in this field the opportunity to produce much of the potash needed in the agriculture of the country. Work is being done on the availability of the potash found in blast furnace and cement-plant flue dust.

During the fiscal year ended June 30, 1918, the kelp plant at Summerland, Calif., in charge of Dr. J. W. Turrentine, was in partial operation. The close of that year found this organization approaching the end of its first year of operation. It was struggling with many problems and difficulties, some of inherent origin and some resulting from the national condition of a state of war. In spite of these, however, the experiments and the investigations were being actively prosecuted with a view to the determination of by-products, the elaboration of processes for their recovery, the perfecting of processes already installed, and the establishment of complete cost and efficiency data regarding all features. These problems were under full development. Organization and production had been brought to a point where over considerable periods operating expenses were approximately equaled by proceeds from sale of the products dry kelp and kelp ash.

At the beginning of the new year, the problem demanding most immediate solution was that of the large-scale leaching of kelp char. This had to be done mechanically and by a nonintermittent process. Processes devised by other concerns were either entire failures or cumbrous and highly inefficient. Following plans drawn up in this office and data established by experimentation here, a lixiviator was constructed and installed and put into operation which represented the immediate and complete solution of this problem.

Following this, the evaporator equipment, already tested by intermittent operation, was put into steady use, and high-grade potash salts became a daily product. Centrifugal and rotary, counter-current, hot-air dryers were installed to reduce the potash salts to the desired moisture content, and a material of high potash content and of a satisfactory physical condition was thus established as a daily product.

As in every other operation, a considerable period of time was consumed in training our operating crew in the details of producing potash salts and in studying the best method of operation of the

apparatus installed. Although the evaporator and crystallizer have been in successful operation for half a year, the refinements of operation yielding potassium chloride of the highest degree of purity have not yet been introduced. This being a matter of no immediate urgency, it has been permitted to await a more favorable opportunity.

As a part of the problem of determining the various factors that influence iodine with respect to its concentration and condition in the various stages of its course from the wet, raw kelp to the mother liquor from which iodine is precipitated, Prof. Merle Randall, of the Department of Chemistry of the University of California, is making a complete study of the composition of solutions; and, on the basis of the results to be obtained, it should be possible easily to introduce those modifications in process which will result in a grade of product so high as to commend itself to the chemical trade and demand a correspondingly high price. No source of potash is known to us which lends itself so readily to the preparation of a chemical grade of potash as does kelp. Every consideration demands that the highest grade of potash practicable be striven for.

A year ago it had just been established that the charcoal yielded as a by-product by the lixiviator and remaining after the potash and iodine had been removed possessed potentially high value as a bleaching carbon or agent for removing coloring matter from a variety of organic liquids and solutions not susceptible of bleaching chemically. This was shown to be potentially as valuable as a material formerly imported from Europe and selling at a price of 20 cents per pound. Recognizing the possibilities which lay in such a by-product, every effort was made both to determine definitely its bleaching power when applied to various classes of products and the best method of its manufacture in satisfactory and uniform condition. Neither problem is yet completely solved, as tests are still being made here and also collaboratively by various commercial concerns, both on laboratory and plant scale, and the ideal method of manufacture has not yet been devised. However, the matter has progressed to the point where sales have been effected at 15 cents per pound and production brought to the point where this product appears about to be able to pay the production cost of itself and of the potash also, if not ultimately the operating cost of the entire enterprise.

Certainly kelp char and potash combined should enable us to pay all expenses and probably yield a profit.

It is definitely established that the process in its present stage of development will yield iodine of a daily value of \$50 to \$75. It is entirely probable that a nearer approach to the theoretical will be attained.

A further development of the crystallization method employed should yield common salt of a degree of purity to warrant its sale as such in the local market in quantity sufficient to represent a considerable daily revenue and net profit.

It is now definitely established by large-scale operations over a period of months that the destructive distillation of kelp yields ammonia in that form which makes possible commercial recovery. Experiments to date indicate no considerable loss of the nitrogen of kelp in other forms. This fact, coupled with that of the simultaneous production of combustible gas of a quality and quantity sufficient

greatly to reduce if not to eliminate fuel consumption (the main item of expense), in connection with the distillation, and of kelp tar, whose subproducts, kelp oils and creosote, have been shown to be of value as flotation agents and disinfectants, respectively, not only justifies that process, but furthermore indicates the certainty wherewith these products may be looked to ultimately to pay the operating expenses of that process and to yield a profit besides.

A prospectus based on results as they stood June 30, 1919, is inserted here as illustrating what is now expected as the results shortly to be attained as the outcome of the present stage of these experiments. The conservativeness of the estimates should counterbalance the prophetic nature of the statement.

**PROSPECTUS OF VALUE OF PRODUCTS OBTAINABLE FROM 100 TONS PER DAY
RAW KELP.**

Potassium chloride, 95 per cent:	
2.5 tons=150 units at \$2-----	\$300
Or 150 units at \$2.50-----	\$375
or 2.5 tons chemical grade at \$250 per ton-----	625
Salt, NaCl, 95 per cent:	
1 ton at \$25-----	25
Iodine, resublimed:	
20 pounds at \$4-----	80
Ammonia, ammonium sulphate, 95 per cent:	
400 pounds NH_3 or 1,600 pounds $(\text{NH}_4)_2\text{SO}_4$ at \$4 per hundredweight--	64
Or aqua ammonia 26° at 5 cents-----	\$60
Bleaching carbon, Norit grade:	
1 ton, 2,000 pounds, at 5 cents-----	100
Or 2,000 pounds at 15 cents-----	\$300
Or 2,000 pounds at 25 cents-----	500
Total per day-----	569
25 days per month at \$569-----	14, 225
Or, per year-----	170, 700

Attention is called to the fact indicated by this prospectus that with potash selling at \$2.50 per unit this plant could be made self-supporting on the basis of potash alone.

We have set ourselves the task of realizing this prophecy, with the exception of the production and sale of ammonia, within the current fiscal year. Since it is believed that profit can be shown without ammonia, in view of the limited funds at our disposal for the current year and the expense (in materials, labor, and especially in time lost) in experimentation with retort furnaces, and since the full retort capacity will be needed for the production of bleaching carbon, it would appear to be wise to proceed with all dispatch to putting the plant on a producing basis with respect to potash, salt, carbon, and iodine, and to look to these for proceeds and profits. We believe that with these alone we can show a profit by the end of the year and that this fact should justify the acceptance of our recommendation that the enterprise be continued and enlarged until it can show whether or not the various other by-products now under investigation can be commercialized and likewise whether or not the process here employed is the most economical one.

In this connection it should be recalled that at the time the initial authorization was enacted three processes were under consideration; namely, (1) the destructive distillation of kelp, the process now under successful development here; (2) the fermentation of kelp;

and (3) the manipulation of kelp to yield feed materials and potash. The second of these was subsequently tested on a magnificent scale by a powder company, at the expense of several millions of dollars, full details of which are now in our possession and will be made a part of the department's records. The third remains to be developed, but preliminary experiments, both here and in France (the latter as a war-time investigation to develop a new source of feed for army horses), strongly indicate that it is entirely feasible while obtaining potash, to prepare a cattle feed in nutritive value of about the grade of oats.

It is the purpose, then, during the year now beginning, to emphasize production and to bend especial effort toward the production on the plant-capacity scale of the main and side products yielded by the process developed and now obtainable with the apparatus installed or about to be installed. At the same time, it is not intended to discontinue researches looking to the development of other products and processes, but on the contrary to pursue them with all the energy which the circumstances will permit. Effort is now being made to secure the services, on a permanent basis, of a research chemist who will reside here and work in the plant laboratory and give the various research problems his undivided attention. The advantage of a thorough laboratory investigation as the preliminary of any attempts to institute plant-scale changes in processes is so marked and its economy is so well recognized that it now seems advisable to await fuller experimental data obtained on the smaller scale before proceeding on the larger scale.

The opportunity for other and more detailed researches on kelp and kelp products is excellent. The field broadens tremendously as progress is made. A materially enlarged staff of chemical engineers, or chemists and engineers, could be advantageously applied to the study of these if funds and program warranted. It would be the greatest mistake to permit the present opportunity to pass without a complete study and solution of the more important of those.

SUMMARY.

(1) At the approach of the end of the second year of operation of the experimental kelp-potash plant, by-products have been discovered, developed, and their commercial obtainability established, which afford every assurance that kelp is to prove a profitable source of American potash, and that the department's work at Summerland will result not only in its complete justification, but also in the establishment of a kelp-potash industry of a substantial nature.

(2) As the year's program it is proposed to produce as many of those products as possible on a large scale in order to demonstrate profits. It is believed that the end of the year will find the plant on a paying basis.

SOIL PHYSICS.

During 1919 the regular research work in soil physics was largely suspended, owing to the employment of the force on nitrogen fixation work, but the routine work of the division was carried on as usual. The machinists were called upon to furnish a great deal of special apparatus and equipment needed in investigational work on war problems. Because of their special knowledge of the physical

factors involved, the larger part of the personnel of the division was utilized in work on the synthesis and oxidation of ammonia, carried on in cooperation with the Bureau of Ordnance, Nitrate Division, of the War Department. The work done was of much assistance to the War Department in solving problems involved in perfecting processes for the fixation of atmospheric nitrogen.

REPORT OF THE ENTOMOLOGIST.

L. O. HOWARD, *Entomologist and Chief of Bureau.*

CEREAL AND FORAGE CROP INSECT INVESTIGATIONS.

The work of this section, continued under the charge of Mr. W. R. Walton, has been of especial importance during the past fiscal year.

EUROPEAN CORN BORER.—In the last annual report of the bureau it was pointed out that this recently discovered insect, accidentally imported from Europe and thoroughly established in a limited region in eastern Massachusetts, threatened to become a pest of great importance throughout the corn-growing regions of the United States unless immediate measures were taken to stop its spread. Shortly after its discovery in 1917, it was shown to occupy apparently an area of about 100 square miles in the immediate vicinity of Boston. Later it was found in the Mohawk Valley of eastern New York, and careful scouting work showed that by the autumn of 1918 it had spread over an area of some 400 square miles. Scouting work in Massachusetts during the autumn of 1918 and the early spring of 1919 showed a distribution throughout 500 square miles of territory. A very vigorous campaign, looking toward extermination, was begun under State agricultural organizations; the New York Legislature appropriated \$100,000, the most of this sum being spent in the spring of 1919, and it is believed that much good was accomplished. A cooperative campaign was started in Massachusetts by Federal and State authorities under a State appropriation of \$50,000, and a considerable part of the infested area was treated in the effort to prevent the natural spread of the insect. A Federal appropriation was asked for, but the bill failed to pass Congress, and all of the work done in the spring of 1919 was carried on with funds provided by the States of New York and Massachusetts. The vulnerable point in the insect's life history is in its hibernation as a caterpillar in the stalks of corn and in the stems of other plants which it attacks, and there is a large list of these. Therefore the most effective work can be done only when the insect is in hibernation; and by the failure of the Federal appropriation the opportunity for very effective work was lost. The result was that, with the appearance of the moths issuing from untreated or imperfectly treated areas in Massachusetts, there was a spread at the end of the fiscal year, so that at the date of the present writing the insect is known to occur over an area of 1,000 square miles, extending from the New Hampshire border on the north to the towns of Marshfield and Brockton on the south, and to the west into the towns of Lincoln and Wayland.

Much new and valuable information regarding the habits of the insect was gained during the year, and several publications were issued by Federal and State organizations, including a Farmers' Bulletin (No. 1046) from the United States Department of Agriculture, giving information as to the best means of destroying the insect in its winter quarters. Several more or less effective means of destroying infested plants were discovered, and it is now being arranged to put these into operation on a large scale immediately after the expiration of the growing season of 1919. Fifteen trained entomologists are now investigating the habits and methods of destroying this pest, and every possible effort will be made to prevent its further spread.

THE HESSIAN FLY.—The annual spring survey of Hessian fly conditions has recently been completed and indicates plainly that this well-known pest is rapidly increasing in abundance in many localities, and has been responsible for a considerable amount of fallen grain in the States east of the Appalachian Mountains, especially in the Shenandoah and Cumberland Valleys. Reports from the western half of the Mississippi Basin also indicate a distinct increase. Warnings have been issued through the news service of the department so that wheat growers may plant at the proper date in the fall of 1919 in order to avoid loss.

THE NORTHERN ARMY WORM.—The true army worm appeared in numbers during late May, 1919, in northern Texas, and damage was done to growing grains soon afterwards through Oklahoma, Missouri, Iowa, Illinois, and western Ohio. The usual remedies were successfully applied in most of the infested territory. In eastern Indiana a serious local outbreak was successfully handled by the county farm advisers under advice from this bureau. In this case the poisoned bran bait was used with excellent effect.

THE SOUTHERN CORN ROOTWORM.—As a result of recent investigations, it has been found that in large portions of the States of Georgia, North Carolina, and South Carolina corn planted before March 31 or after May 10 is more or less immune from the attacks of the southern corn rootworm. The Coastal Plain, however, from southern Virginia to Florida differs, and no regulation of planting time seems seriously to affect the insect in this region.

THE ALFALFA WEEVIL.—A successful method of spraying alfalfa to destroy the alfalfa weevil has been found, and its efficacy thoroughly demonstrated in Utah. It is possible to apply this method successfully at a cost not to exceed \$1 per acre, and serious losses, even to the first crop of alfalfa, can be avoided. This first crop, under previous methods of control, was usually sacrificed. The large-scale use of this method during the early part of 1919 resulted so advantageously that the method will undoubtedly be generally adopted. The alfalfa weevil is at present causing much concern in Colorado, and spraying work has been undertaken in cooperation with the officials of that State.

GRASSHOPPERS.—Much valuable assistance in the form of personal advice has been given to State and county officials in the successful conduct of grasshopper extermination work throughout the States of North Dakota, South Dakota, Minnesota, Iowa, Montana, Cali-

fornia, Kansas, Nebraska, Missouri, Oregon, and Washington during the summer of 1918 and spring of 1919. The loss of many hundred thousand dollars' worth of crops has been prevented as the result of these activities.

OTHER INSECTS AFFECTING CEREAL AND FORAGE CROPS.—Studies of the jointworms have been continued with excellent results. Control experiments with the alfalfa-seed Chalcis have been carried on in cooperation with the Arizona Commission of Agriculture and Horticulture in the Buckeye Valley of Arizona, resulting in an apparent decrease of 15 per cent in the infestation and a net profit of more than \$43 per acre in the experimental plot.

Experimental control work on the coulee cricket conducted during the spring of 1918 was apparently successful, and the insect has made no destructive appearance during 1919.

Studies of the alfalfa caterpillar, the harvester ant, white grubs, billbugs, wireworms, and the European sawfly in wheat have been continued with favorable results. The last-named insect has been watched with especial care, because it seems capable of doing considerable damage to the winter wheat crop under conditions favorable to its multiplication.

STORED-PRODUCT INSECT INVESTIGATIONS.

Dr. E. A. Back has continued in immediate charge of this branch of the bureau's work.

CORN WEEVILS.—During the past year a laboratory has been established at Orlando, Fla., for the purpose of studying the biology and methods of control of corn weevils. Enough has already been learned of the biology of these insects to form the basis for control work. At Athens, Ga., an office has been established in cooperation with the Georgia Agricultural Experiment Station, from which expert information regarding preserving corn from weevils has been disseminated among southern farmers.

BEAN AND PEA WEEVILS.—The great increase in weevil losses to California-grown beans and peas during the past few years has led to the establishment of a laboratory at Alhambra, Calif., at which the causes for weevil increase and the methods of control are being investigated. The work has received the hearty cooperation of the bean growers and warehousemen of the Pacific coast.

FLOUR BEETLES.—The biology of various species of flour beetles of the genus *Tribolium* that attack flour in all warehouses throughout the United States is being made the object of an especial investigation with headquarters at Dallas, Tex.

FUMIGATION AS A CONTROL METHOD FOR STORED-PRODUCT INSECTS.—Experimental work to determine the usefulness of fumigation in lessening or preventing the enormous waste taking place through insect attack to stored goods in warehouses, though as yet extending over only a short period, has yielded practical results of great value.

ELECTRICITY AS A CONTROL AGENT.—During the past year cooperative work has been carried on to determine the effectiveness of electricity as a control agent in the suppression of insects in cereals in package form. A commercial machine for sterilizing cartons of

cereals after the latter have been sealed has been installed in a large cereal factory, with every promise of practical value. Should expectations be realized, the electrical treatment will result in great saving both to producers and consumers.

COLD STORAGE AS A CONTROL MEASURE.—The value of cold-storage temperatures in preventing insect damage to warehoused products has already been proved. Cold storage is being depended upon by wholesale and retail dealers of certain classes of foods and other products as the only satisfactory method of protection from insects. Detailed data regarding the effect of low temperatures upon various insects attacking stored products are being secured.

HOUSEHOLD PESTS.—Investigation of household pests other than the bedbug, flies, and mosquitoes, which was discontinued during the war, has been resumed. Several pests that are believed by the general public to be limited to houses, as clothes moths, cockroaches, and carpet beetles, have been found to be frequently very injurious to valuable materials stored in warehouses throughout the country.

INSPECTION AND INTELLIGENCE SERVICE.—The arrangements made during the war with the Quartermaster Department of the Army at the port of New York, whereby the bureau has undertaken to make frequent inspections of food and clothing supplies, proved so satisfactory that they have remained in force and are being extended to other food depots, not only of the Army but of the Navy. The purpose of this cooperation is to keep the Quartermaster Departments of the Army and Navy informed, through inspections made by bureau experts, not only of conditions of food supplies purchased and delivered at the warehouses, but also of their condition from time to time during the storage period. Such inspections detect and lead to the checking of insect ravages before the insects have had a chance to multiply and cause great loss.

The dissemination of information regarding the suppression of insects affecting stored food supplies and food products, which during the past two years has monopolized the efforts of this branch of the bureau work, is being continued, although the return to a peace basis is making it possible to open up the new lines of research indicated in preceding paragraphs.

DECIDUOUS FRUIT INSECT INVESTIGATIONS.

Investigations of the insects of this class have been carried out under the direction of Dr. A. L. Quaintance, as formerly.

APPLE INSECT INVESTIGATIONS.

CODLING MOTH.—Detailed life history studies of this insect, under way for some years in different parts of the country, were begun during the fiscal year in two new localities, and much additional knowledge, especially with reference to climatic conditions as affecting severity of damage, has been obtained. Numerous localities reported unusual injury to apples about harvest time, from recently hatched larvæ producing the so-called "sting," and there was considerable demand upon the office for local studies of the life history of the insect as well as investigations in orchards to perfect spraying schedules. The "sting" damage to apples in one State was estimated to have caused a loss of \$2,000,000 and the sum total of

injury done by this pest in different regions represents a very heavy tax on the apple growers.

In Colorado, where work is being done in cooperation with the State agricultural experiment station, the life history studies were completed and the work was confined to orchards. In the Grand Valley in this State codling moth losses have always been severe, and many orchardists have been unable to obtain satisfactory control, even by thorough spraying. Study indicates that this was due to lack of co-operation among orchardists thoroughly to spray over a large area. Consequently arrangements were made with a number of contiguous orchardists whereby they individually agreed to spray according to the department's recommendations, and thus try out on a large scale the effect of uniformity of spraying operations over hundreds of acres. This prevents the overflow of codling moths from poorly cared-for orchards into well treated orchards, and good results are expected.

Cooperative work in the Rogue River Valley of Oregon has been continued. The approximate dates when the larvæ of the different broods enter the fruit have been established, and a sound basis has been gained for a schedule of applications not only for apples but also for pears.

In the Ozark region in Arkansas similar work has been continued, and has been done cooperatively with the Bureau of Plant Industry on account of the importance of plant diseases in the orchards of that section. It seems probable that in that locality dusting can not be relied upon as a substitute for spraying. There are three full broods of the codling moth in this region and a partial fourth brood. There is a distinct interval between the appearance of the first and second brood larvæ, but from that date on they are continuously in the orchards. These life-history studies in this region have been practically completed, and a sound spraying schedule will probably be arranged by the close of the present season.

Work of this general character has also been carried on cooperatively in Delaware and in the State of Washington, and at the bureau's laboratory at Wallingford, Conn., the codling moth has also been studied. The insect in the latter region is much less troublesome than in the central, southern, and western regions, and it seems likely that a single thorough spraying at the time of the falling of the petals will prove sufficient to protect the fruit.

APPLE-TREE AND OTHER BORERS.—The work with the apple-tree and pear-tree borers has practically been completed, and publications will shortly be issued.

APPLE PLANT-LICE.—Intensive work has been done with these insects, especially with reference to the exact determination of alternate food plants and the identity of certain confused forms. This has involved an enormous amount of work, and decisive results are about to be reached.

In addition to the apple insects mentioned above, a considerable number of other species which live in apple orchards have been studied, but most of these are of lesser economic importance in the general run of seasons. As it often happens, however, that one of these minor pests becomes for a season or more very injurious, it is necessary that the bureau should anticipate such outbreaks by securing thorough biological information.

GRAPE INSECTS.

THE GRAPE-BERRY MOTH.—Vineyards were selected in several widely separated sections of the northern Ohio grape belt to serve as object lessons for vineyardists and to give them personal instructions in spraying effectively. It has been shown that the grape-berry moth can be controlled by two applications of arsenate of lead in spray form, leaving the fruit practically free from residue at picking time. In certain cases a single application has been sufficient, but here there were no surrounding badly infested vineyards. This indicates that eventually a single spray in general will keep the pest in check.

THE GRAPE MEALYBUG.—Full life-history studies of this insect have been finished. Fumigation with cyanid of soda and with sulphur fumes has been satisfactory in the dormant season at night, but sulphur is considered the better. January has been found to be the best time for this work. Spraying has proved less effective than fumigation. A campaign of education among grape growers has been begun to secure their cooperation in restricting the spread of the pest on picking boxes and in other ways.

THE GRAPE PHYLLOXERA.—In collaboration with the Bureau of Soils of this department, a survey of Fresno County has been made to determine the influence of the physical nature of soils on the degree of infestation of vineyards by the Phylloxera. Interesting and valuable facts have been ascertained. Investigations have been made concerning the best methods of disinfecting grape propagating stock destined for shipment.

THE GRAPE SPHINX MOTH.—An interesting instance of the value of entomological knowledge occurred when this insect appeared in numbers in Tulare County during the fiscal year, over some 700 acres of vineyards. The bureau's agent cooperated with the vineyardists, and, at an outlay of about \$12,000 for labor, spraying materials, and machinery, the grape crop, valued at \$180,000, was saved.

A number of other grape insects have been studied and new biological data ascertained.

NUT INSECTS.

PECAN INSECTS.—Special attention has been given to the use of insecticides in pecan orchards in Georgia and Florida. Arsenicals are being tried in the form of dusts and sprays, and another season's work should show conclusively the comparative merits of these two methods. In Texas, the bureau has been especially interested in the native pecan groves along river bottoms and elsewhere. In these native groves satisfactory control is very difficult and insect injury is quite severe; in fact, 90 per cent of the pecan crop here was lost during 1918. Three species of insects are principally involved.

INSECTS INJURIOUS TO WALNUTS, BUTTERNUTS, ETC., IN THE NORTHERN STATES.—This work, especially with the walnut curculio, the hickory curculio, and another species that attacks the leaf stems of hickory, and with other species as well, has been taken up by the bureau, with headquarters at French Creek, W. Va. A thorough investigation of insects attacking nuts other than pecan throughout the country will be carried on.

CRANBERRY INSECTS.

In the last annual report the beginning of the work on insects in cranberry bogs in the State of Washington was mentioned. This work, in cooperation with the Washington Agricultural Experiment Station, has been continued and important results have been reached. On bogs badly infested by the blackhead fireworm satisfactory results have been secured from three applications at intervals of from 17 to 21 days between May 1 and July 1 of nicotine sulphate containing 40 per cent nicotine used at the rate of 1 to 800, with the addition of fish-oil soap at the rate of 2 pounds to each 50 gallons, the spray being applied at the rate of 250 to 550 gallons per acre. Of the spray nozzles tested that known as the Bordeaux appears to be best suited. Growers have generally adopted this treatment and are getting good results. Detailed life-history studies of this insect are nearing completion, as are also studies of the cranberry root weevil. It has been shown of this latter species that it can be controlled by spraying the foliage during May and June with 2 pounds of arsenate of lead to 50 gallons of Bordeaux mixture.

A general survey of insect conditions is being made on cranberry bogs on the Pacific coast, and it is hoped that by the close of the season a report can be prepared on the principal cranberry insects of that territory.

PEACH INSECTS.

Tests of paradichlorobenzene as a treatment for the peach borer were continued through the growing season of 1918. Experiments with this gas have now been carried on during a period of three years in the peach districts of Maryland, Ohio, Arkansas, Virginia, West Virginia, and Georgia. In some cases blocks of trees have been treated two and three years in succession. It has been found that three-fourths of an ounce or 1 ounce of the chemical per tree applied in the fall after the moths have laid their eggs will result in the destruction of about 95 per cent of the larvæ. No injury has resulted from this dosage to trees 6 years old and over. Younger trees, on account of their thinner bark, have sometimes been injured.

Experiments as to the comparative merits of dusting and spraying in the control of the plum curculio and certain peach diseases have been continued in cooperation with the Bureau of Plant Industry at Fort Valley, Ga., Agricultural College, Miss., and Bentonville, Ark. The summer of 1919 has been an unusual one and control measures have been put to a severe test. The dusting method in a general way seems to compare favorably with spraying, even under the worst conditions.

THE JAPANESE BEETLE.

The introduction and establishment of this insect in the vicinity of Riverton, N. J., was mentioned for the first time in the last annual report. The work of eradication and control has been vigorously prosecuted in cooperation with the New Jersey State Department of Agriculture. The operations have been materially enlarged, but in spite of all that has been done the insect is increasing rapidly, spreading over new territory, and at the time of the present writing is perhaps 150 per cent more abundant than at the same time last year. Many experimental lines are being worked. Cyanid of soda in solu-

tion has been used to destroy the grubs in the ground, at the rate of 1 pound to 200 gallons of water and applied at the rate of 22,000 gallons per acre. While the beetles are flying, a wide barrier of poisoned foliage is maintained as completely as possible around the whole area of infestation. Where the beetles are most abundant they have been systematically collected in hand nets. An active collector can secure several quarts of the beetles in a day, and as each quart contains 4,000 individuals, this method is important. About 1,000,000 beetles have already been collected. Plowing the soil infested by the grubs and pupæ appears to destroy them. It will be necessary to do this kind of work very extensively in waste places and many areas not under cultivation. Weeds along the roadsides have been burned to destroy their food and render such places unattractive to the beetles, thus reducing the danger of their being carried by vehicles, pedestrians, and so on. In the same way, waste places along ditches and other spots which can not well be treated with cyanid are being cleared of weeds, and this work is being extended into the wide barrier of poisoned foliage surrounding the area of infestation. Close study is being made of the relative abundance of the insect in different parts of the area and on the methods of dissemination, and a quarantine is in force providing for the examination and certification of green sweet corn going out to market, since the beetles penetrate the tips of the ears and could thus be widely spread. A local citizens' committee has been established, which is of greatest assistance in the work of arranging cooperation of property holders with the agents of the bureau and the State. The work is now well organized, and we have a much better idea of the problem. It seems, from the rapid increase and spread of the insect during the summer of 1919, that the work must be greatly enlarged to be entirely successful.

INSECTICIDE INVESTIGATIONS.

At the various field laboratories tests have been made of many proprietary insecticides in comparison with homemade articles.

Work on the so-called "Derris," an insecticide made from plants of the genus of this name, has been completed. If this insecticide can be obtained in sufficient quantities it will prove an important addition to our list of substances that kill soft-bodied insects like plant-lice.

Studies on the various arsenical insecticides, like arsenate of lead, arsenate of lime, zinc arsenite, and so on, have been continued. Large-scale feeding experiments have been carried on with caterpillars and other insects. Experiments under different climatic conditions with these substances have also been continued. Additional experience confirms the conclusion reported last year that arsenate of lime may be used in all situations as a substitute for Paris green, and that it will also, for pomaceous fruits, prove a satisfactory substitute for arsenate of lead when used with lime or fungicides containing lime.

It has been shown that nicotine sulphate is an unsatisfactory substance to use against the eggs of the codling moth in the field. Nicotine is, however, coming rapidly into use as an insecticide in other ways, and the bureau has been trying to find a less expensive substitute. The results already obtained are promising. Basic studies in

connection with this work have been made on the physiology of injurious insects, especially on their olfactory organs, and a number of publications have been issued on this subject.

NATURAL CONTROL.

Under this head, studies of insect-destroying fungi have been continued, especially a fungous disease of cutworms. An obscure disease of the so-called seventeen-year locust, or periodical Cicada, has also been studied.

Work with the ladybird known as *Hippodamia convergens*, in the Imperial Valley of California, has been continued in cooperation with the California State Horticultural Commission, especially in regard to certain needed changes in the method of handling the insects. This work will be continued.

An especial study has been begun of the natural enemies of the plant-lice which are injurious to walnuts in southern California.

INVESTIGATIONS OF INSECTS INJURIOUS TO VEGETABLE AND TRUCK CROPS.

Work upon this group of insects has been continued as heretofore under the direction of Dr. F. H. Chittenden. Under the necessity for stimulation of food production much of the research conducted on the less important subjects under this head was temporarily discontinued, and attention was especially directed to the important staple crops.

SWEET POTATO WEEVIL ERADICATION AND CONTROL.

Continuing the policy of the fiscal year 1918, under a \$50,000 allotment for the eradication and control of this insect, intensive work was done. The definite boundaries of infestation were established in Florida, Georgia, Alabama, Mississippi, Louisiana, and Texas. More than 30,000 farms were inspected during planting and harvest (since at these times the presence of the weevil is most apparent), and the infested properties were listed and mapped. Large-scale experiments in control have been continued. In one large eradication project in Florida, selected for demonstration since it embodies most of the serious difficulties to be encountered, material progress has been made. All of the infested estates have been subjected to continuous supervision, contracts have been made with the growers for the destruction of all seed potatoes grown on infested land, and the scrupulous execution of these contracts has been rigidly enforced. More than 1,000,000 weevil-free sweet-potato draws have been distributed to growers by cooperation with the Florida State Plant Board. This materially aids in the eradication of the weevil without interfering with the production of potatoes, since the contracts provide for clean culture and a fallow period of six weeks prior to planting, together with other repressive measures. It is believed that as the result of this work the end of the growing season will find this locality practically, if not completely, weevil free.

In Alabama, the infestation was found to be confined to a single well-defined locality in Baldwin County, and excellent cooperation has been secured with growers toward the application of all necessary repressive measures. It is believed that this isolated outbreak will be entirely cleaned up in another season.

In Mississippi the passage of a drastic crop-pest law materially aided in the eradication measures, the establishment of a quarantine rendering complete control of intercounty shipments possible. The comparatively light infestation in this State has been mapped, and a material reduction of the area infested has been secured.

In Louisiana survey work has been continued, and growers have been visited and urged to apply methods devised by the bureau. Reinspection recently indicates that gratifying results have been reached in the majority of cases. A careful study has been made in this State as well as in Mississippi of the other food plants of the morning-glory group, especially the large-rooted perennial morning-glories, and a number of chemicals have been tested as weed killers, to be used against these wild food plants.

In Texas, 85 counties have been found infested with the weevil, which has been distributed apparently largely through commercial growers of slips shipping from the Gulf and south-central portions of the State. There is no law in Texas controlling the shipment of infested plant material, which is a serious drawback to the control of the weevil in that State. The fact that salable sweet potatoes can not be produced in some of the coast counties has helped the widespread distribution of the weevil, as draws grown from unsalable stock often prove more profitable than the growing of tubers. Life-history studies at Kingsville, Tex., showed at least six generations of the weevils annually, indicating an enormous rate of increase. Spraying experiments at this point have reduced infestation from 44.51 per cent to from 2.88 to 12.18 per cent.

INSECTS AFFECTING POTATO, TOMATO, AND ALLIED CROPS.

The potato aphid, an unexpected pest which made its appearance in 1917 and again in the early summer of 1918, was experimented with on into July, 1919. The use of nicotine sprays at increased strengths demonstrated practical control in Maryland, New Jersey, and Maine.

The spinach aphid, which has during recent years become troublesome as a potato pest, and which also affects cabbage, beets, lettuce, and other staple vegetable crops over a still wider range of territory, has been the subject of continued investigations along the Atlantic coast. A new station in the Aroostook region in Maine, a great potato center, has been established for the study of the Colorado potato beetle, the potato flea-beetle, and other potato pests. An investigation of the spread of the Colorado potato beetle on the Pacific coast has been conducted. The infested localities have been mapped and a campaign has been begun to spread a knowledge of the importance of control measures.

Other potato insects have been studied in Wisconsin and Iowa.

INSECTS AFFECTING GROWING BEANS AND PEAS.

The bean ladybird has recurred in numbers in Colorado and New Mexico. Experiments have shown that it can be controlled with lead arsenate and zinc arsenite sprays.

The enormous plantings of beans in southern California, owing to war conditions, resulted in serious injury to the crop from the corn earworm, and investigations of this insect under these conditions

have been made. The tremendous spread of this crop resulted in the great multiplication of the insect, and with the reduction of the bean acreage this season serious damage will very likely result from the abundance of the pest.

The pea moth, an imported pest already well established in Canada, has made its appearance in injurious numbers in Wisconsin, where it seems to be greatly increasing in number, necessitating additional investigations of its life history in order that a sound remedy may be established.

INSECTS INJURIOUS TO CABBAGE AND ALLIED PLANTS.

An investigation of the western cabbage flea-beetle, a pest of much importance in the Western States, has been completed, and the results are available for immediate publication.

The harlequin cabbage bug, after one of the periods of inactivity in the North which have several times been noted, is likely now to reinfest its northern range at any time, and an emergency bulletin on methods of control has been prepared.

An imported horse-radish pest, hitherto known as injurious only in Canada, has made its appearance in destructive numbers in Virginia, and is being studied. It will live on other crucifers, and if not controlled may become a pest of much importance.

SUGAR BEET INSECTS.

Work on the sugar beet leafhopper, which is the cause of the malady known as "curly-top," was terminated at Spreckles, Calif., and the station was removed to Riverside that the study of certain points in the life history of the insect and the relation of temperature and humidity to its development might be completed. A considerable percentage of parasitism has been observed during the year.

OTHER TRUCK CROP INSECTS.

Much good work was done with a number of other insects, including the onion thrips and the onion maggots, the melon aphid, several strawberry insects, and others. A notably good result was obtained in the case of the celery leaf-tier, since it was demonstrated that it could successfully be controlled by spraying with arsenate of lead at the rate of 1 pound to 50 gallons of water, the first spray to be made when the eggs are hatching and repeated every two weeks as long as the "worms" are to be found. This was accomplished at a cost, for labor and material, of \$2.35 per acre.

INVESTIGATIONS OF INSECTS AFFECTING FOREST RESOURCES.

The work in forest entomology has been continued during the past year under the direction, as before, of Dr. A. D. Hopkins. The results accomplished by this section of the bureau deserve especial mention and justify the expenditure of a larger sum of money in this direction.

WESTERN FIELD WORK.

An especial investigation of the insect damage to crude spruce products for airplane stock in the States of Washington and Oregon showed that the greater part if not all of the damage could be pre-

vented by proper methods of logging and production with little or no additional cost.

Exhaustive studies of insect investigation and control were continued in the Sequoia and Yosemite National Parks. Much new information has been gained, and the methods of gathering and compiling field data have been standardized.

A special study was completed on the interrelation of forest fires and insects on an area of about 8,000 acres in southern Oregon. This area had been under observation since 1914, and the fire had burned over about 800 acres in 1918. The records show that previous to the fire the insects had killed 485,000 board feet of timber. The fire killed 170,000 feet, and subsequently the slightly fire-injured as well as the uninjured trees in the burned area were killed by beetles, which were attracted from the surrounding areas. It was noticed that the infestation in the burned area increased more than 1,000 per cent, but it was found that the infestation in the surrounding areas decreased. It was also found that the broods of the beetles in the fire-scorched trees failed to develop to much beyond the original number that attacked the trees. So the fire did not contribute to an increase of the beetles in the general area or to the starting or extension of an epidemic of beetles. This result is of extreme interest and hardly to be expected.

The most careful study ever made of the history of an epidemic infestation by tree-killing beetles was completed and a report submitted during the year. In the Rogue River area in about 48,000 acres near Ashland, Oreg., the western pine beetle in 1914 caused the death of 346,000 board feet of pine timber. In 1915, 1,615,000 board feet were killed; 1,383,000 feet in 1916; and 608,000 in 1917. A count of the young and matured stages of the beetles that developed in an average foot of bark, and also of the number of exit holes through which the beetles emerged to attack other trees, showed that there was a notable decrease in numbers during the development of the broods each year in the infested trees on account of the increase of natural enemies and other disturbing factors. This helps explain why these beetle epidemics rise and fall within a limited period of years, and it explains how the western forests of yellow pine are naturally protected from total destruction. These facts are especially significant in connection with the application of the percentage principle of control, as by aiding the natural forces which work against the abnormal increase and spread of the beetles complete control may be gained. The history of this epidemic shows the importance of prompt recognition and prompt treatment of a threatened outbreak in order to prevent the great loss of timber which would occur before natural control became operative.

Another special study was made of the number of all stages of the western pine beetle in 330 square feet of infested bark selected from 67 trees, which represented an average infestation within an area of approximately 36 square miles. It was shown that there is a large percentage of mortality between the young and matured stages in the developing broods, but that normally an average of about 150 beetles to the square foot of bark developed to the adult, or reproductive, stage; which would be 50,000 beetles to the average infested tree, or, say, 39,000 beetles to 1,000 board feet of timber. Since it requires an average of about 10 beetles to the square foot to attack

and kill a vigorous, healthy tree, it will be seen that all the pine timber of the western forests would soon be destroyed were it not for natural and artificial control.

Experiments to determine the time of year to cut and the methods of handling mesquite for fuel, posts, etc., to avoid destruction by wood-boring insects, have been nearly completed, and the results show that serious loss in the Southwest can be prevented by cutting the trees in the late fall and early winter and piling the wood in loose piles until it is thoroughly dry. Damage to posts can be prevented by cutting them at any time and laying them on the ground where they will receive the full force of the sun, turning them occasionally so that the young stages of the borers will be killed by the heat.

Studies of damage to lead telephone cables in California by a wood-boring beetle have been continued, and the results so far show that the beetle is able to penetrate alloyed substances that are considerably harder than lead. The problem is still unsolved, and it will be difficult to find a practical means of controlling this pest, which is able to put hundreds of telephones out of commission by boring holes in the cables, through which the water enters, rendering the wire connections useless until the place is found and repaired.

EASTERN WORK.

Continued experiments with chemical substances applied to finished and crude forest products show that very few of the many substances that have been tried are effective, and, with crude products, none of them are so economical as simple and inexpensive management in logging and manufacture which will render the conditions of the bark and the wood unfavorable to attack.

Continued studies of termite, or white ant, damage to the wood-work of buildings has led to the discovery that one of the most destructive species can not live if deprived of moisture in ground or foundation timbers; thus it is possible to prevent serious damage.

Investigations of shade-tree insects have continued, and there has been much correspondence about insects of this class.

The recent appearance of the so-called seventeen-year locust, or periodical cicada, has given an opportunity for detailed study of certain points, and motion pictures have been made.

STUDIES OF THE BIOCLIMATIC LAW.

A law of latitude, longitude, and altitude as a guide to practice in fighting insects, and of value in the practice of agriculture, was first worked out by Dr. Hopkins, the chief of this section, in relation to forest and other injurious insects. It has proved, however, of such wide application that he has worked upon its various aspects with much assiduity. Extensive studies of the advance of the spring season were carried on over a large portion of the United States, and over 19,000 records of periodical events in plants and insects were made in the East. The most important result of this special study of the advance of spring is in the almost complete verification of evidence in support of the law that has been formulated from a preceding study of 40,000 records of reported dates of wheat harvest

and of records of altitude limits of life zones. Applications of this law appear to be of great value in the study of all problems relating to periodical farm practice, the warfare against insects among others.

TROPICAL AND SUBTROPICAL FRUIT INSECT INVESTIGATIONS.

This branch of the bureau's investigations is under the charge of the assistant chief of the Bureau, Mr. C. L. Marlatt,

INVESTIGATIONS OF INSECTS AFFECTING CITRUS FRUITS IN CALIFORNIA.—A considerable portion of the time of the investigators assigned to this project has been devoted to extension work in connection with the efforts to stimulate production as a war measure. The research work of this station has been continued with respect to the investigation of the availability of liquid hydrocyanic acid for the fumigation of citrus trees and the control of citrus mealybugs and the Argentine ant. For the purpose of experimentation with the liquid hydrocyanic acid, a 600-acre citrus ranch at Orange was placed at the disposal of the agents of this department, and very careful records have been kept on the subject of dosage, exposure, and effect of meteorological and soil conditions, and also of previous insecticidal treatments. Paralleling these orchard experiments, certain necessary physical and chemical examinations have been made of the liquid cyanid, involving the examination and analysis of over a hundred different samples to determine variation in the chemical composition and the causes of such variation, involving both methods of production and impurities. This investigation has resulted in the determination of proper dosage tables for effective use against the different scale insects infesting citrus trees under the different conditions outlined—tables which have been published and are now available and are being generally followed in orchard work in southern California.

The control of the Argentine ant, which has rapidly spread during the last few years in the citrus districts in California with the resultant large increase of damage by mealybugs, which it harbors and distributes, has been continued and a more efficient ant poison has been developed especially in its application to the dryer conditions of California. Demonstrations with this poison in the control of ants and the attendant mealybugs have been made at the various places in the principal citrus-producing counties of California. A method of control of the citrophilus mealybug, which has recently become a very serious pest in limited regions of the citrus belt of California, by banding and the use of ant poisons, has been developed which has resulted in one of the most notable successes in insect control done in the State. This method of control has practically eliminated this mealybug from upward of 500 acres near Upland, Calif., and, in fact, over most of the district infested by this insect, and for the first time in years the owners of these orchards are able to sell their fruit in prime condition at the highest market price. This method of control will be rapidly extended over the entire infested district.

In connection with the investigation of the two principal mealybug enemies of citrus plants in southern California, the parasitic and predatory enemies of these insects have been further investigated as also the symbiotic relations of these insects with the Argentine ant.

The department has cooperated with the California authorities in the determination of the best methods of exterminating the European snail (*Helix pisana*) which has become established in a small canyon or district near San Diego. As a result of this investigation and of various conferences the method of control now being carried out by the State is the burning over of the district with torches fed with oil under pressure totally to destroy the vegetation. This snail was possibly introduced by some foreigner familiar with its food value in Europe, without thought as to its tremendous possibility for harm to cultivated crops.

CITRUS FRUIT INSECTS IN FLORIDA.—The work under this project during the year has been largely limited to demonstrational work in the aid of increased production. Spraying demonstrations have been conducted widely throughout the State. A revised schedule for fumigation and treatment of trees to prevent insect injury has been worked out for the grapefruit, and a Farmers' Bulletin (No. 1011) has been issued entitled "The Woolly White Fly in Florida Citrus Groves." Some special lines of investigation have had to do with the stabilizing of insecticides especially where the only water available is obtained from deep wells containing a large percentage of mineral elements which more or less affect the stability of certain emulsions and other insecticides. The work in Florida has had particular relation to the citrus white fly, the rust mite, and the common Florida scale insects. The work in the control of citrus pests in Florida has shown the greater availability of liquid sprays over the fumigation methods commonly followed on the Pacific coast. During the last two years, however, considerable demonstration work has been done with fumigation in Florida by a private concern, the results of which have been carefully examined by the expert of this department as a protection to citrus growers and to determine that any claims made are fully justified.

INVESTIGATIONS OF INSECTS AFFECTING MANGO, GUAVA, AVOCADO, AND OTHER SUBTROPICAL FRUITS.—The mango and avocado and other fruits mentioned under this heading are being commercially developed on a considerable scale in southern Florida. A station has been established at Miami in cooperation with the Office of Foreign Seed and Plant Introduction of the Bureau of Plant Industry of this department to investigate the peculiar insect enemies of these fruits. Due to the proximity and commercial connections of southern Florida with Bermuda, the West Indian Islands, and Central America, this region is especially open to invasion by important fruit pests, and several of these have already gained entrance. One feature of the project, therefore, is to cooperate with the Federal Horticultural Board in safeguarding against further introductions of such insects from the sources named. The work of the last year under this station has had particular relation to several important insect enemies of the avocado. Already effective means of control of the principal avocado insects have been devised, notably with respect to leaf-infesting mites, to species of thrips, and several scale insects. Work has also been done with respect to insect enemies of the mango and the papaya.

STUDIES OF GREENHOUSE INSECTS.—Under this project, life-history studies and methods of controlling the chrysanthemum midge, a very important injurious insect of this plant in eastern greenhouses, have

been completed and presented for publication. A bulletin (Department Bulletin 778) has also been published during the year giving the life history and methods of controlling the rose midge. Work has also been done with respect to the effective utilization of various insecticides and in the general problem of fumigating plant houses.

MEDITERRANEAN FRUIT FLY AND MELON FLY.—This work is a continuing one, and has been carried on at the bureau's laboratory in Honolulu. The research features of the work have consisted in further studies of control by the agency of parasites and natural enemies. The principal work, however, has remained as heretofore in the inspection and certification of bananas, pineapples, taro, and coconuts for shipment from Hawaii to the mainland of the United States.

GEOGRAPHICAL DISTRIBUTION OF FRUIT FLIES.—The work under this project has for its special object the surveys of districts contiguous to the United States, from which the importation of fruit and plants may be the means of introduction of fruit flies and other enemies of important fruit crops. During the past fiscal year the field work under this project has involved explorations of the Panama Canal Zone, British Guiana, and the West Indian Islands of Barbados, Trinidad, Tobago, and Grenada, continuing the work which was done the previous year in Cuba, Jamaica, Dominican Republic, and the Virgin Islands. In the course of this work a great many insects have been collected and studied of known or potential economic importance and in addition a very considerable miscellaneous collection of insects has been made. The investigations were conducted in plant gardens maintained by the local departments of agriculture of the different islands and such general surveys as were possible within the time limits. Particular attention has been paid throughout the work to fruit flies, scale insects, and such other pests as are particularly likely to be carried from country to country by traffic in fruits and plants. A good portion of the time of the expert engaged in this work is necessarily devoted to the identification of the material collected and the working up of results.

INVESTIGATION OF FRUIT FLIES AND OTHER TROPICAL AND SUBTROPICAL FRUIT INSECTS IN THE CANAL ZONE, PANAMA.—This is a new project which has been established in cooperation with the authorities governing the Panama Canal Zone and the Federal Horticultural Board to study the important insects infesting tropical and subtropical fruits, cultures of which are being developed under the encouragement of the Government authorities in the zone. The importance of this investigation is due to the fact that the several important fruit flies and other tropical and subtropical fruit insects are now established in the zone, and to the further fact that the zone is more or less of a world's crossroads, i. e., a place where insect pests from remote places may be carried through the agency of commerce and easily gain lodgment, later, perhaps, to effect entry into the mainland cultures, tropical and subtropical, of the United States. This work, now in progress for one year, has developed useful information. Much work has been done in connection with the so-called black fly of citrus and other plants, which has become established in the Canal Zone and in the West Indies, and which a very determined effort is being made to exclude from the southern United States. A considerable number of other important injurious insects have al-

ready been discovered and have been the subject of studies. Among these are no less than four different kinds of fruit flies. There have been found in the Canal Zone also a number of insects which very injuriously affect commercial woods and wood structures. Termites are very important subtropical insects found in the Canal Zone. Several of these are abundant in the State of Panama and several have been found in the Canal Zone, some of which are very destructive to garden crops. The entrance of some of these into the United States would be followed by great injuries. The number of subjects which have been investigated at this station is already enormous, and a very convincing showing has been made of the need of keeping constantly in touch with the plant cultures and insect enemies in this district as a means of benefiting local production, but particularly as furnishing information on which any necessary protective action in the interests of the United States may be taken.

WORK ON THE GIPSY MOTH AND BROWN-TAIL MOTH.

This work has been continued under the supervision of Mr. A. F. Burgess, with headquarters at Melrose Highlands, Mass.

For the first time since the bureau began work to prevent the spread of these insects, it is possible to report a substantial decrease in the infested territory. This amounts to 1,824 square miles previously infested with the gipsy moth and 5,385 square miles by the brown-tail moth. Twenty-eight towns in New Hampshire, 6 in Vermont, 8 in Massachusetts, and 10 in Connecticut, 52 towns in all, were found to be free from gipsy moth infestation and were eliminated from the quarantine area this year. There is now under quarantine on account of the infestation by the gipsy moth 20,747 square miles in New England. Isolated colonies of the gipsy moth, which were found in previous years in New York, Ohio, New Jersey, and the western part of Massachusetts, have again been carefully examined but no infestation found. There seems to be no reasonable doubt that the insect has been exterminated in these colonies.

The decrease in area infested with the brown-tail moth includes 34 towns in Maine, 58 in New Hampshire, 6 in Vermont, 37 in Massachusetts, and 10 in Connecticut, a total of 145, embracing an area of 5,385 square miles which was released from quarantine this year. There are now quarantined on account of this insect 28,752 square miles.

FIELD CONTROL WORK.—The field work has been carried along on the same general lines as in previous years. As the scouting of the border area failed to reveal infestations in many towns, it was possible to devote more time and effort to the control of bad colonies located on exposed places in towns inside the border. Work of this character is exceedingly important, as it tends to reduce the opportunity for small caterpillars to be spread by the wind and helps to prevent new infestations from becoming established outside the border and in the area which has been cleaned. Scouting was carried on in 130 towns, and in a number of these towns the work was checked up by special scouts, known as trailers, to determine whether egg clusters were being missed. This method is constantly employed in order to keep the work on an efficient basis.

In the fall of 1918 several tons of gipsy moth banding material was prepared at the field storehouse at Franklin, N. H. About 4 tons of this material was applied to the trees early in the spring, and excellent results were secured. During the winter five of the horse-drawn spraying machines were converted into motor-propelled outfits and there were available 12 motor-truck sprayers and 7 horse-drawn machines, with the necessary hose, nozzles, and other accessories. These machines were distributed along the infested border and work was taken up as soon as the foliage was large enough to be sprayed. For the first time since the work began, dry arsenate of lead was used instead of paste. The results were satisfactory; and more of this material will be used in the future if the price is as favorable as is that of the paste form.

Spraying was carried on in 36 towns as follows: New Hampshire, 25; Massachusetts, 3; Rhode Island, 4; Connecticut, 4; 3,280 acres of infested woodland was sprayed; also 6,800 fruit and shade trees. This work in the border territory was greatly facilitated by the spraying carried on by the State entomologist in Connecticut. The work was arranged so that one motor truck furnished by the State and one horse-drawn sprayer treated the infestations in a number of towns.

PRESENT CONDITION OF THE AREAS INFESTED WITH THE GIPSY MOTH AND THE BROWN-TAIL MOTH.—The winter of 1917-18 was the most severe that has been experienced in New England for many years. Not only was the temperature abnormally low, but the snowfall was exceedingly heavy, except along the coast. These conditions were partly responsible for the failure of many gipsy moth eggs to hatch in the spring.

In the summer of 1918 serious defoliation by the gipsy moth existed in the Cape Cod region in Massachusetts, but small defoliated areas could be found in many other sections. Advantage was taken of this condition in planning the field work in the summer and fall of 1918, and, by taking advantage of the reduction in infestation in many localities, it was possible to clear many colonies.

The winter of 1918-19 was exceedingly mild and gipsy moth eggs survived and a very large proportion hatched.

Some of the parasites, particularly *Schedius*, which destroys gipsy moth eggs in the fall, were not nearly as numerous this year as heretofore, and the other introduced parasites do not appear to have fully recovered from the setback received during the previous winter. The wilt disease was also less abundant and effective this year than usual. As a result of these conditions heavy feeding by the gipsy moth has appeared over the greater part of the infested area in eastern Massachusetts and New Hampshire.

The present indications are that stripping will be more severe next summer, and if weather conditions are favorable for the spread of the small caterpillars by the wind next spring it will not be surprising if some of the recently cleared border towns become reinfested. The gipsy-moth problem is therefore more difficult than usual and the most strenuous measures will be necessary in order to hold the insect within the territory now infested until the parasites and diseases have become more numerous and effective in the worst infested regions.

The brown-tail moth appears to be on the increase in the eastern part of the territory, although special efforts were made by the State officials to clean up isolated infestations in the spring of 1919. Unless all colonies of this insect are thoroughly treated it is likely to increase its range.

SOUTHERN FIELD CROP INSECT INVESTIGATIONS.

The work of this class has been carried on, as before, under the direction of Dr. W. D. Hunter.

POISONING THE COTTON-BOLL WEEVIL.—In last year's report it was shown that one of the most striking achievements of the bureau which culminated during the year was the determination of the great value of powdered lead arsenate or calcium arsenate against the cotton-boll weevil. Large-scale experiments have been continued since that report. The methods and details of procedure of keeping the boll weevil in check by this method have been improved and thoroughly tested on a large scale. Cotton planters all over the weevil-infested portion of the cotton belt are taking up this method, and hundreds of individual inquiries in regard to it have been answered. The bureau is certain, however, that the exact methods which have been successful under conditions that exist in the Mississippi Delta will not be perfectly applicable to all portions of the cotton belt. Therefore, circulars have been issued regarding the general application and making it plain to planters that methods should be varied according to conditions. The weevil has been more numerous during the summer of 1919 than it was during the previous summer, and planters have therefore been more than ever desirous of trying this remedy. The bureau, therefore, has been especially anxious to guard them from mistakes.

An enlargement of this investigation seems necessary to bring about the best results. Experimental farms should be established in a dozen or more cotton-growing regions, and the very best method for each region must be worked out before planters can apply the remedy with confidence. The commercial results that have been reached already, however, in the delta region assure ultimate results of probably equal value in the other parts of the cotton belt after these comparative studies shall have been made.

OTHER COTTON INSECTS.—At the laboratory at Madison, Fla., a study of the Hemiptera attacking cotton east of the Mississippi River has been completed. At this station also a thorough study has been made of the varieties of sea-island cotton with especial reference to earliness of growth under boll-weevil conditions. Thirty-two varieties have been tested in this work. The importance of early fruiting of sea-island cotton under weevil conditions can not be overestimated. Careful studies at this point have also been made on the relation of the immature stages of the weevil to temperatures. The dry period in Florida, usually commencing about the 20th of May and extending to the 20th of June, seems to retard the weevil to such an extent that the problem of growing upland cotton under weevil conditions is very encouraging.

INSECTS AFFECTING SUGAR CANE.—The best hope for control of the moth borer of sugar cane now seems to be the importation and establishment of parasites which exist in Cuba. Experts were sent to Cuba

in the beginning of the fiscal year and again in April, 1919. Parasites have been imported, and every effort is being made to propagate them in the Louisiana cane fields.

TOBACCO INSECTS.—In Florida, promising control of the tobacco flea-beetle has been obtained with certain insecticides—an important result, as in 1918 one grower claimed a loss from this insect of \$650 per acre. Dusting methods in the shade-grown tobacco region have been revolutionized by the introduction of power machines which are capable of dusting from 10 to 20 acres per day more than can be done with hand dusters. For the tobacco thrips it has been found that nicotine sulphate, 14 ounces, and soap, 3 pounds, to 50 gallons of water, gives satisfactory control if applied properly once a week during the emergence period. A very important point is the time of application. Much valuable work has been done on other tobacco insects.

RICE INSECTS.—A Farmers' Bulletin treating of the principal insect enemies of the rice crop in the United States has been prepared for publication.

INSECTS AFFECTING THE HEALTH OF MAN AND ANIMALS.

In cooperation with the National Research Council and the Surgeon General's Office of the War Department, studies on the body louse were actively pursued during the year. This work resulted in the accumulation of much practical information concerning the value of the laundry processes, the dry-cleaning processes, and other means of control. A large number of chemical methods of treatment were also studied, and additional observation on the bionomics of lice was made. Many proprietary louse remedies were carefully tested, in cooperation with the Insecticide and Fungicide Board, thus protecting the Government against expenditures for worthless remedies.

An expert of the bureau has been assigned to work, in cooperation with the Public Health Service, on the problem of the species and habits of flies breeding in human excreta, especially in the open privies in rural communities of hookworm regions. The headquarters of this work are at Wilmington, N. C.

Several of the experts of the bureau were assigned to sanitary work in the Army, especially with relation to the insects that carry disease.

The work on insects affecting domestic animals has been considerably enlarged. Investigations of the biology, distribution, and methods of control of the ox warble were especially taken up, and important facts were gained in regard to biology. The work upon the screw worm was continued, as well as investigations of the horse-flies in eastern California and Nevada. Life histories of three of the more important species have been fairly well worked out. The lice of domestic animals have been studied from the remedial point of view, and methods of applying sodium fluorid to destroy chicken lice and pigeon lice have been perfected. Some supervision of certain packing establishments has been carried on in the effort to reduce the number of flies. This has been a continuation of previous work and is of much importance.

BEE CULTURE INVESTIGATIONS.

This work has continued under the supervision of Dr. E. F. Phillips. It has been chiefly a continuation of the campaign for increasing the honey crop, which was begun as a war measure. The educational activities then begun have been so eagerly received that they can not be discontinued, and it is still important that the enormous loss of ungathered nectar shall be reduced. During the year the apiary and laboratory were moved to a building in Somerset, Md.

DEMONSTRATIONS IN BEE CULTURE.—In addition to funds available under the regular appropriation, \$15,000, available from the food-production act, was used for demonstrations. The work was conducted as one project. As qualified men were found the number of agents was increased until there were in the field 16 men, working in cooperation with the several extension divisions of the 20 States to which they were assigned. Because of the great difficulty of finding competent men, it was possible to maintain an average force of only 12.

The work of these men was an effort to instruct beekeepers in better methods of production and care of their bees, so that the honey crop of the country might be increased. It will be desirable for many years to keep on increasing the production of honey, in order to conserve this natural resource which is now so generally wasted. There was also a great demand for honey for export to the allied countries, and this demand has continued since the cessation of hostilities.

During the fiscal year the field men, assisted from time to time by the regular office force, held over 1,000 meetings, attended by 25,000 beekeepers, and in addition they have visited over 2,500 apiaries and have given personal instruction to the owners regarding their beekeeping practices. The work of organizing the beekeepers into associations has been continued, and in several States these county organizations are being federated with the State beekeepers' organizations. There are now over 300 such county associations of beekeepers. During the year arrangements were made so that every man of the field force is assigned to a single State in cooperation with the extension divisions, both cooperating organizations paying part of the expense.

The meetings held by the field men must be limited in the topics discussed, and it is impossible to cover many important lines of work for lack of time. To overcome this difficulty a trial was made in the holding of extension short courses of a week's duration. The first of these schools was held in California during the year, and these were so successful, in spite of the severe influenza epidemic, that the same plan was later put in operation in New York, Indiana, Iowa, and Minnesota. The average attendance at these schools was about 100 beekeepers, who came for intensive instruction for a period of a week, and the work with these men during these schools leads to a strong belief that more good was done than could have been accomplished in the same time with shorter meetings even with a larger number in attendance. These schools are planned for commercial beekeepers. The instruction was on fundamental problems of the beekeepers, no attention being given to the mere simple mechanical operations, but emphasis was placed on the reasons for various practices as based on the behavior of the bees. In every

State where the work was given the beekeepers and extension officials have asked that similar schools be held in the future, and other States have asked for schools.

A bulletin on commercial comb-honey production (Farmers' Bulletin 1039) was issued during the year. It is a revision of Farmers' Bulletin 503. A bulletin on swarm control is in process of preparation, and one on extracted honey production. When these bulletins are issued it is planned to publish a bulletin on beginning beekeeping, and then to discontinue the present general bulletin on beekeeping (Farmers' Bulletin 447) and to replace it with one which will serve to tie together the various technical bulletins on special topics.

WINTERING OF BEES.—Little work has been done during the year on the investigational phases of this problem, because the field men have been necessarily occupied with purely practical work and the office force with answering requests for information sent in by beekeepers, but observations have been continued which fully substantiate the results of the more detailed work. During the year two bulletins of a practical nature were published—Farmers' Bulletin 1012, on the care of bees when wintered outdoors, and Farmers' Bulletin 1014, on wintering bees in cellars. These bulletins give explicit directions for the care of bees during the winter season and contain recommendations applicable to the entire country. It is gratifying to report that beekeepers throughout the country are paying more attention to the careful wintering of their bees since the bureau took up this subject for investigation.

DISEASES OF BEES.—During the year a paper (Department Bulletin 780) was published on Nosema disease, a malady of adult bees which may at times cause some loss. A bulletin (Farmers' Bulletin 975) was issued on the preventive and remedial measures to be employed against European foulbrood, and in this bulletin for the first time detailed attention is given to the factors which may successfully be used by the beekeeper to prevent the inroads of this disease. Papers on the etiology of American foulbrood and European foulbrood were also prepared, and a paper on the behavior of bees in the cleaning out of European foulbrood, a phase of investigation which had previously been neglected, but one which now promises to yield most important results from the standpoint of control of the disease. An investigation was made of the peculiar manifestations of European foulbrood in California, where, because of the climatic conditions and the character and time of the honey flow, and perhaps especially because of the methods of beekeeping employed, the disease is unusually destructive and shows characteristics not often encountered elsewhere. During the year 563 samples were received from apiary inspectors and from beekeepers for diagnosis.

EFFECT OF THE WAR ON BEEKEEPING.

In the last annual report attention was called to the effects that the war had on the beekeeping industry. The increased demand for honey for export has continued ever since the cessation of hostilities and there is reason to expect that this market will continue to be an important factor in American beekeeping. During the period of severe sugar shortage, the home consumption of honey was greatly increased, but beekeepers were worried for fear that when sugar

became plentiful this demand would cease. If beekeepers are able to produce enough honey to meet this increased and increasing demand this enlarged home consumption will continue. The local sales of honey, near the points of production, increased more rapidly than sales in the larger markets, but this can readily be remedied by the further development of the larger bottling trade in honey for which there is demand.

After the winter loss in the white clover region during the winter 1917-18, the beekeepers of this region found themselves short of bees in the spring of 1918, just at a time when there was the greatest opportunity to build up their business. This produced a great demand for bees in combless packages from the Southern States and resulted in the building up of a large business of this character, which will continue and will be an important factor in beekeeping in the future. The supply of bees from the South in 1918 probably did not fully replace the winter loss during the summer of 1918, but because of the increase made by beekeepers there are probably more bees in the important clover region than ever before. The demand for queenbees to be furnished by professional queen breeders was so great during the spring of 1919 that practically all of them had more orders by May 1 than they could fill during the entire summer. In the West, where the loss of bees was not unusual, there has been even a greater increase in the holdings of the larger beekeepers, resulting in a greater difference between the commercial holdings and the bees in the hands of amateur beekeepers. The tendency to collect the bees of the country in the hands of commercial beekeepers is a most wholesome sign for the proper development of the beekeeping industry for the future, and the war's net result on beekeeping will be an increase in the commercial aspect of the business. The increase of commercial beekeeping has greatly increased the demand for assistance to beekeepers and has made them eager to accept the extension activities of the office. The correspondence of the office is now twice what it was before the entrance of the United States into the war. The demand for beekeepers' supplies and for literature on beekeeping has been greater than ever before in the history of beekeeping in the country.

In explanation of the desirability of making the beekeeping industry one which is in the hands of professional beekeepers rather than to urge the keeping of bees on every farm, it may be stated that the prevalence of the two destructive brood diseases throughout the country, and especially the necessity of careful study of beekeeping problems in order to obtain the maximum crop, make it almost impossible for the person having only a few colonies to give the care to the bees which will result in good beekeeping. Only the man who makes this his chief work may expect to get the returns which are obtained from colonies properly cared for.

GENERAL SUMMARY OF THE WAR ACTIVITIES OF THE BUREAU.

(1) A very perfect system of reporting insect outbreaks was organized, the result of which was a close knowledge of the exact conditions almost from day to day of insect-pest increase over the whole United States. These conditions were made known to all of the economic entomologists of the country through circular let-

ters, and by cooperation based upon this intimate knowledge crop pests were held in check and food production greatly helped.

(2) By conferences with the chemists and the insecticide manufacturers the problem of the reduced quantity of arsenic (on account of its use in munitions) was met, and by conservative use and better distribution the supply was made to cover the needs of the farmers, fruit growers, gardeners, and others.

(3) The bureau assisted the Quartermaster General's Department of the Army by inspecting the enormous quantities of grain and other material intended for shipment to Europe and gave advice as to fumigation and other treatment when such stored products were found to be infested with insects. It also inspected warehouses and mills in the same way in many parts of the country.

(4) Advice was given to representatives of the War and Navy Departments and the Shipping Board relative to insect damage to lumber and stored wooden implements.

(5) By the efforts of the beekeeping section of the bureau the beekeepers of the country were aroused to the necessity of a great increase in honey, owing to the shortage of sugar. Specialists were sent out, held meetings, addressed more than 25,000 beekeepers, visited the apiaries, and gave personal instruction, with the result that the honey crop was greatly increased. Our exports of honey to allied countries increased at least ten times over those of any period previous to the war, and the domestic consumption of honey also greatly increased.

(6) In medical entomology the bureau maintained a thorough cooperation with the Office of the Surgeon General of the Army in the matter of experimental work on insect problems. All insect remedies reported to the Medical Department of the Army were referred to the bureau for opinion or for test. The most extensive work was done on the subject of the body louse, and branch laboratories were established for experimental tests. Experts of the bureau were in several cases engaged for special work in concentration camps against insects carrying disease, and at the close of the war one of these experts, who had early entered the Army as a reserve officer, had virtual charge of the great delousing plant at Camp Mills, through which troops returning from Europe were passed.

The foregoing six paragraphs include only the broadest outline of the work which, were it to be stated in more detail, would indicate that in very many directions the bureau's services were most important.

REPORT OF CHIEF OF BUREAU OF BIOLOGICAL SURVEY.

E. W. NELSON, *Chief of Bureau.*

ECONOMIC INVESTIGATIONS.

Largely increased war emergency funds were added to the regular appropriation during this fiscal year for the campaign against predatory animals and injurious rodents. As a result, the work was more

thoroughly organized and was conducted on a greater scale than during any previous year. The Federal funds available for this purpose amounted to \$592,000. To this was added a total of more than \$800,000 by States, counties, farmers and stock-growers' organizations, and individuals, in funds expended in cooperation with, and mainly under the direct guidance of, the Biological Survey. In addition to these funds, much material and the personal services of many thousands of farmers and stock growers were contributed to the field work, in assisting to destroy animal pests both on private lands and on Government lands adjacent to private holdings. In North Dakota about 42,000 farmers joined in the work and in Montana about 18,000. In other States cooperation was general and involved large numbers of men.

During the early part of 1919 the legislatures of Arizona, Colorado, Idaho, Nevada, New Mexico, North Dakota, Montana, Oregon, California, Texas, Utah, and Washington made direct appropriations amounting to \$688,000 to be expended in this work during the two following years in cooperation with the Biological Survey.

Wherever work has been undertaken the rapid growth of cooperative funds and the increase in the number of men participating furnish a practical demonstration of its success and usefulness. The bureau is in constant receipt of urgent requests for additional help far beyond the limits set by its available funds.

Estimates based on information supplied by farmers and stockmen indicate that the destruction of more than 32,000 predatory animals under the direction of the Biological Survey during the year resulted in a saving of live stock valued at approximately \$5,000,000; and the destruction of prairie dogs and other rodents resulted in a saving of enormous quantities of forage, and also of crops valued at not less than \$14,000,000.

PREDATORY ANIMALS AND RABIES.

Of the total funds available for the campaign against injurious animals, about \$375,000 was provided for use in destroying wolves, coyotes, mountain lions, bobcats, and other stock-killing animals and for the suppression of wild animals affected with rabies. For the prosecution of this work, which began in 1915, the Western States have been organized into 10 districts, each with a trained inspector in charge, as follows: (1) Arizona, (2) California-Nevada, (3) Colorado, (4) Idaho, (5) New Mexico, (6) Montana, (7) Oregon-Washington, (8) Texas, (9) Utah, (10) Wyoming-South Dakota.

During the year a force of from 400 to 500 skilled hunters has been employed under the direction of the various inspectors. The salaries of a part of the hunters are paid from the Federal Treasury and of the others from cooperative funds supplied by the States or by contributions from local organizations and individuals. As heretofore, the hunters are not permitted to receive bounties, and the skins taken by each become the property of the Federal Government, the State, or the organization or individual providing the money for salary. Skins taken by Federal hunters during the year netted the Federal Government \$76,128.56, which has been turned into the United States Treasury, making the total received by the Government from this source to date \$197,387.37.

The number of skins or scalps of predatory animals taken by official hunters during the year is as follows: Wolves, 584; coyotes, 27,100; mountain lions, 149; bobcats, 4,123; Canada lynxes, 43; bears, 81. In addition, as a result of poisonous operations, so many dead coyotes are reported by stock growers to have been found on the ranges where poisoning operations were conducted that it is safe to estimate the number destroyed in this way as more than equaling the approximately 32,000 predatory animals of which the skins and scalps were taken.

Predatory-animal hunters are directed to consider bears under ordinary circumstances as game animals and have positive instructions to take every precaution not to kill any except those known to be destructive to live stock. Unfortunately, occasional unoffending bears are taken in traps set for other animals, thus making the number of bears killed during the year considerably larger than would otherwise be the case. The vast majority of bears are inoffensive so far as injury to stock is concerned, but occasional individuals in all parts of the range country become stock killers, some of them being notoriously cunning and destructive in their activities. Naturally such animals must be eliminated, and the more promptly this is done the less prejudice there is likely to be created among the stock growers against all bears.

From much expert study and experimentation, great improvements in methods of poisoning predatory animals have resulted. Larger and more thoroughly organized poisoning campaigns than ever before attempted were conducted during the year. Their success was such that in many areas stock growers are urging the extension of this method as being the most practicable one for the control of coyotes. Extended poisoning operations were conducted in the great sheep-growing sections in Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming. This was followed by a marked decrease in the number of coyotes in the sections poisoned, with a corresponding decrease in the losses of sheep, cattle, pigs, colts, and poultry. Reports have been received from stockmen stating that on many important ranges and lambing grounds the former heavy annual losses have become negligible or have been entirely eliminated.

For a number of years rabies has been prevalent among predatory animals in California, Idaho, Nevada, Oregon, Washington, and Utah. A part of the money available for predatory-animal control has been appropriated for the specific purpose of destroying the wild animals affected with this disease in the States named. Although the disease still maintains a foothold in all of these States, efforts in suppressing its carriers have been so successful that its spread to other States has been prevented, and the number of domestic animals and persons bitten by rabid wild animals has steadily decreased until at present the number is very small. When an outbreak of the disease occurs in any district, hunters are immediately concentrated there, so that the wild animals carrying the rabies are summarily destroyed and the spread of the disease is promptly stopped.

The serious situation resulting from the outbreak of rabies before it was controlled is indicated by the fact that in the fiscal year 1915-16, when the principal outbreak in Nevada occurred, it was estimated that live stock in that State valued at about \$500,000

were lost through being bitten by rabid animals. Some ranches lost from 200 to 400 head of cattle. Up to the present time approximately 1,500 persons are known to have been bitten by rabid animals and treated for the disease, and at least 47 are known to have died from it. Without Federal intervention for the suppression of rabies, the ravages brought about by it would have been vastly increased. Furthermore, it should be borne in mind that with the disease still persistent in scattered localities throughout the territory where it was once generally prevalent, the removal of organized preventive measures would at once result in its renewal and spread throughout the western range States.

Special efforts are being made by inspectors of the bureau to destroy individual predatory animals which have become notorious for their stock-killing exploits in various States. Near Dubois, Wyo., a mountain lion was killed in the spring of 1919 which was known to have destroyed \$1,000 worth of live stock last October and to have killed a number of cattle during the winter. This was a much-hunted and battle-scarred animal which had been wounded a number of times by private hunters. Another mountain lion taken in April had killed seven colts during the spring. In the same State a pair of wolves were killed—the female by a Government hunter and the male by a private hunter—which had destroyed more than \$2,500 worth of stock during the preceding year. The owner of a ranch near Mertzon, Tex., reported that in less than three months his losses amounted to nearly 300 sheep, valued at \$3,200, caused by 6 coyotes which one of our hunters captured during July. In western Colorado, in an area about 75 miles in diameter which was poisoned two successive years, through cooperation between local stock growers and the bureau, sheep owners reported formerly a loss of about 25 sheep a day throughout the season, but the destruction of predatory animals has been so thorough that at present the losses are nominal, and sheep are reported to range freely, sometimes unattended for several days in succession, without loss. In New Mexico the wolves, which were estimated to number between 300 and 400 at the time the campaign began there, have been reduced to less than 30 individuals, and this number is being steadily decreased by the persistent campaign against them. These remaining wolves are mainly experienced adults, causing annual losses of live stock amounting to about \$2,000 each. In southern New Mexico the stock of wolves is constantly renewed by stragglers from the mountains of northern Chihuahua. In addition to the ravages from the native predatory animals, live stock in parts of Texas, Arizona, and other States suffer from depredations by dogs which have gone wild and have taken up the predatory life of wolves. In some places the dogs join the wolves, and the half-breed offspring increase the packs.

RODENT CONTROL.

As in the previous fiscal years, the war emergency need for increasing the food output caused the bureau to concentrate its campaign against injurious rodents about farm areas. As heretofore, the effectiveness of this work was greatly increased by the cooperation of the States Relations Service of the Department of Agriculture and of the extension services of State agricultural colleges.

The county-agent organization of the latter, in greatly enlarging the educational campaign, brought about a public appreciation of the enormous losses from the depredations of rodents and secured the cooperation of the farmers on a large scale. As a consequence the most vigorous and successful drive yet made was conducted against the myriads of prairie dogs, jack rabbits, field mice, and other rodent pests which seriously decreased the output of grain, alfalfa fields, and orchards and lessened the value of truck and garden crops, as well as of forage on the stock ranges throughout the West.

Cooperative campaigns with local organizations and individuals were conducted in Arizona, California, Colorado, Georgia, Idaho, Kansas, Maryland, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, and Wyoming. Preliminary conferences were held in reference to the organization of similar work in Iowa, Minnesota, and Texas. Investigations for bettering the methods of destroying injurious rodents as well as improving the organization are being conducted, and the work is becoming increasingly effective.

Field investigations through inclosed trial plots for the purpose of securing accurate data as to the destruction of forage by rodents on the open range have been continued during the year in cooperation with the Forest Service, the State University of Arizona, and the Carnegie Institution of Washington. Interesting and valuable results are being secured.

The demands from the States for increased activities in rodent-control work, and the money offered by States and counties for cooperative purposes, are far greater than the bureau can possibly meet with its available funds. The opportunity for useful expansion in this work is obvious in view of the fact that native rodents destroy each year field crops and forage worth approximately \$300,000,000, while the losses from house rats and mice approximate nearly \$200,000,000, a large proportion of which can be eliminated at moderate cost.

Through a system of contracts the bureau has been able to assist the States in securing poison supplies for use in rodent campaigns at a discount amounting to many thousands of dollars, thus increasing the effective use of their funds.

PRAIRIE DOGS.

Prairie dogs occupy more than 100,000,000 acres of public and private lands. Wherever they occur in abundance they are exceedingly destructive to cultivated crops and to forage on the open range. In cooperation with the extension services of the agricultural colleges in Arizona, Colorado, Montana, New Mexico, North Dakota, Oklahoma, South Dakota, Utah, and Wyoming, the campaign against these animals has been pushed aggressively. In Arizona and New Mexico the State councils of defense joined actively in the work and contributed funds for the purpose. The participation of farmers and stockmen has been fuller than ever before, and the saving of crops and forage has been correspondingly great. During the year from 75 to 95 per cent of the prairie dogs were destroyed on nearly 2,000,000 acres of privately owned crop and forage lands and on more than 200,000 acres of public domain, the latter making more

than 3,700,000 acres of public lands which have been largely freed from these pests. In many places private landowners were so interested that they volunteered their services to clear adjacent Government lands, the bureau supplying the poison to be used in the work. With cooperation of this character it will be possible to clear large areas of the public domain at almost a nominal cost to the Government.

GROUND SQUIRRELS.

Numerous species of ground squirrels occur in the West, several of them having such wide ranges and existing in such abundance that their depredations on crops and forage are most serious. As with the prairie dogs, continued investigations are being made to devise improved methods of poisoning and of organization for their destruction. The poisoned grain used for operations against ground squirrels on private lands is prepared under the supervision of field representatives of the bureau and furnished cooperating farmers at cost through local organizations. In this way 1,349 tons of poisoned grain were prepared and distributed during the year, and nearly 110,000 farmers took part in the campaign.

Through the plan inaugurated by the bureau of cooperative purchase of poison supplies the saving in the squirrel campaign, as well as in the destruction of other rodents, has been very great, as illustrated in Idaho, where it amounted to about \$18,500.

During the year ground squirrels were poisoned and mostly destroyed on more than 1,294,000 acres of public domain and on more than 13,465,000 acres of private lands. This resulted in materially increasing the percentage of crops harvested in all the States where work was conducted and in increasing the forage output on the public domain.

JACK RABBITS AND COTTONTAILS.

As in previous years, work was done to control the losses of crops, including wheat, barley, oats, beans, alfalfa, and others, from jack rabbits, particularly in Arizona, Idaho, Nevada, New Mexico, Oregon, Utah, and Washington. Wherever market and other conditions were favorable, jack rabbits were killed by drives and by trapping in order that they might be sold for food. In this way two counties in Utah, under the direction of a representative of the bureau, marketed 6,500 of these animals, besides the large numbers marketed independently. Effort is being made to develop the utilization of the meat and skins of these animals through standardized methods of dressing and marketing. In many places where it was impracticable to kill jack rabbits for market purposes extended poisoning operations were conducted, as in Idaho, where in this way 40,000 of these animals were killed in one county.

In addition to damage by jack rabbits, complaints have been received by the bureau of depredations by cottontails among fruit trees, and in truck and other agricultural crops. Complaints of losses from this source have been more numerous from the Eastern States, where demonstrations have been given to teach farmers the most practicable means of protecting their crops from these animals.

POCKET GOPHERS.

Pocket gophers are exceedingly injurious to root crops, peanuts, beans, alfalfa, hay meadows, grazing lands, and orchards. The seriousness of their depredations is indicated by an estimate made by a competent official of the Kansas Agricultural College that during 1918 they destroyed one-tenth of the alfalfa crop in that State. The alfalfa crop of Kansas for that year was valued at \$50,000,000, so that the damage by pocket gophers to this crop alone amounted to about \$5,000,000. In view of the fact that these animals also do extensive damage to orchard and other crops, the injurious character of this pest is evident. Pocket gophers have a wide distribution in practically all of the States from the Mississippi River to the Pacific coast. On some of the most productive grazing lands on the national forests they seriously reduce the forage production. Methods of destroying these animals adapted to use in extensive community campaigns have been much improved during the year.

Pocket gophers not only damage established crops, but frequently interfere with the introduction of new and valuable crops. This was well illustrated at Hearne, Tex., where the quarantine against the pink cotton boll worm prevented the growing of cotton. The State agricultural college planned to foster the planting of peanuts as an important food and feed crop, but this was found to be impracticable on account of the abundance of pocket gophers. At the request of the agricultural college, an experienced representative of the Biological Survey was detailed to assist in organizing a community campaign against these animals. Farmers and business men joined heartily in the work, with the result that every pocket gopher in the area treated was reported killed, and an excellent crop of peanuts was planted and harvested.

MOUNTAIN BEAVERS AND WOODCHUCKS.

The investigations were continued into the habits of the mountain beaver, or sewellel, a curious rodent living in the humid region of the Northwest coast. With the development of agriculture in its region this animal, which was formerly considered harmless, has become increasingly injurious to crops, particularly to small fruits and to market produce. Methods for its control have been devised, and demonstrations were made by a representative of the bureau in various localities in Washington and Oregon where there was need for the adoption of active measures.

Woodchucks have continued to be a source of annoyance and loss to gardeners and truck growers throughout the northern and northwestern sections of the country. In many parts of the Northwest the planting of alfalfa and clover and of other succulent crops has attracted the attention of woodchucks, which have concentrated about these new sources of food supply, with attendant losses to the farmer. In some of the Northwestern States where the woodchucks live in the rocks adjacent to cultivated fields, strips of alfalfa and clover several hundred feet wide along the borders are often completely destroyed. It was found that the methods of destroying these animals used successfully in places where they live in burrows in the open country were not effective in this region. Successful methods were here developed, however, and as many as 55 woodchucks have been killed in a single field demonstration.

NATIVE MICE, WOOD RATS, AND COTTON RATS.

Widespread damage to orchards by the depredations of native mice continue to be reported, the most conspicuous occurring in the States of Virginia and Washington. In Winchester County, Va., the loss is reported of more than \$200,000 by pine mice, which gnaw the bark from the roots of orchard trees. Demonstrations have been given for the control of these pests.

In Florida surprisingly successful experimental plantings of sugar cane on a considerable scale have been made within the last two years, but during the year reports have been received of extensive damage to the cane by rodents which destroy the seed cane and cut the growing stalks. So serious has been this damage that the principal company interested in the development of the sugar-cane industry in that State has written the bureau that unless some method can be found for successfully controlling the cane-destroying rodents the development of the industry there will be impossible. Losses of from 40 to 60 per cent of the growing cane have been reported. The depredations are by the cotton rat, a small ratlike rodent limited to the South Atlantic and Gulf States. Investigation has determined effective methods of poisoning these rodents, and it is believed that through demonstrations and advice the growers will be able to control the rats and reduce the losses to a negligible amount.

Wood rats continue to be troublesome in limited areas, and where they become especially injurious demonstrations and advice have been given for their control.

HOUSE RATS AND MICE.

The extended educational campaign inaugurated last year was continued in order to acquaint the public with the serious drain on the Nation's food resources through depredations of house rats. Demonstrations were given of methods of poisoning and trapping the animals, and plans for community organization against them were presented and discussed. As a result many State officials, State councils of defense, and public-spirited citizens took up the work of organizing campaigns, and great numbers of the rodents were destroyed.

Requests were made by military and naval officers in charge of camps, arsenals, and storage warehouses in this country for advice and assistance in controlling house rats in the buildings under their control. Experienced representatives were detailed to investigate conditions and recommend plans for limiting the losses. Gratifying results were obtained, perhaps the most important of which was at the Bush Terminal warehouses in Brooklyn, N. Y. These great warehouses were taken over by the Government for Army quartermaster storehouses, and were so badly infested by rats as seriously to endanger the stored food and other Army supplies. At the request of the quartermaster officer in charge, a representative of the bureau made a survey of the warehouses in January, 1918, and recommended a method of procedure for controlling the rats. At the end of the year the quartermaster officer in charge advised that the recommendations of the bureau had been followed with complete success. He reported that at first practically a barrelful of rats were killed each day, and that more than 35,000 rats were

killed during the year. The work of destruction was so thorough that he reports the losses of military supplies during the entire year to have been negligible.

Large numbers of the Farmers' Bulletin (No. 896) giving information concerning the destruction of rats were used in this country by the Quartermaster Department of the Army and also in France in an effort to control losses from these animals.

In this connection it may be stated that several experts in rodent control who were commissioned in the Sanitary Corps of the American Expeditionary Forces in France for the purpose of controlling the depredations of rats in connection with the Army operations, were highly successful in preventing heavy losses of quartermaster stores from these rodents.

MOLES.

Throughout the year demonstrations were continued in Washington and Oregon for the control of the large moles which are a serious pest to agriculture in that region. The fur value of these animals having been established among fur dealers through the efforts of the Biological Survey, the price of their skins continues to advance. In cooperation with extension services and other agricultural agencies in their territory, demonstrations of methods for capturing the animals and preparing their pelts for market were continued. Successful boys' and girls' clubs were organized to trap them and to cooperate in selling the skins. As a result the members of the clubs learned a valuable lesson in cooperative work, not only in ridding fields of a pest, but also in marketing, the sale of the skins netting them the substantial sum of more than \$50,000.

DOMESTIC RABBITS.

The high cost of meat during the war and the scarcity of rabbit skins for manufacturing felt hats and cheap grades of furs combined in emphasizing the opportunity in this country for the profitable production of rabbits. In Europe the growing of domestic rabbits has long been an industry of considerable importance conducted on a small scale by numberless individuals, and it has already been abundantly proved that domestic rabbits do equally well in the United States. Not only is their meat of excellent quality, but their fur is of value also; recently these furs have been manufactured on a considerable scale, dyed and in their natural colors, and are frequently most attractive in appearance.

Under ordinary conditions the rearing of domestic rabbits will give a quick and economical supply of meat, one that can be produced cheaper than that of the domestic fowl; while the skins of selected stock are of sufficient value to render them an important part of the returns. A growing interest has been shown in the bulletins and other publicity from this bureau designed to encourage the growing of these animals on farms and in back yards. National and State rabbit breeders' associations are now well established; clubs and associations are being organized and periodicals developed to increase rabbit growing; and many boys' and girls' clubs have taken up the enterprise. It is believed that through these methods a great increase in the development of this young industry may be brought about.

With a view to fostering the production of these animals along practical lines investigations have been continued among the breeders of the country and among those dealing in the skins and manufacturing the furs. An article on rabbit growing to supplement the meat supply was published in the Yearbook of the Department for 1918, and a bulletin is now in process of preparation to supersede the Farmers' Bulletin (No. 496) on "Raising Belgian Hares and Other Rabbits."

FUR-BEARING ANIMALS.

Investigations concerning fur-bearing animals have been continued and the annual bulletin on laws relating to these animals was issued. The animals now held at the experimental fur farm in Essex County, N. Y., include minks, martens, fishers, skunks, raccoons, and rabbits. Experiments in inclosures for these animals, as well as in feeding and breeding them, and investigations concerning the parasites and diseases to which they are subject, are in progress. Two graded Saanen goats have been furnished by the Bureau of Animal Industry for use at the farm to provide milk for feeding the fur animals and to keep down weeds in the animal yards. Domestic rabbits are also being grown at the farm in order to supply the fur bearers, especially the breeding females, with fresh meat. The keeping of a few domestic animals at the fur farm has necessitated a limited amount of farming there to produce feed in the form of hay, oats, buckwheat, corn, carrots, and turnips. A building to shelter the rabbits and goats and to store feed for them has been completed during the year, and ground has been cleared and material assembled to build yards to accommodate four pairs of cross foxes.

An inquiry concerning the supply of furs from wild fur-bearing animals has been addressed to a large number of raw-fur dealers throughout the United States, including Alaska. This has developed the fact that there has been an alarming reduction in the number of skins coming to the market during the last decade, and that there is a general demand for short open seasons on fur-bearing animals, and particularly for better enforcement of State laws against trapping fur-bearing animals when their fur is not prime.

Most States now have laws protecting fur bearers during at least a part of the year. Up to within a recent time most of the fur bearers, including such species as the skunk and the mink, have been considered pests, because they at times raid chicken coops. The apparently infrequent damage done by these animals is negligible as against their great value. The skunk feeds largely on field mice and insects and has become one of our most valuable fur bearers. The Commissioner of Conservation of New York reports that during 1918 skunk skins taken in that State brought more than \$1,000,000 in the fur market. There is no State in the country which can not greatly increase the natural resources represented by its fur-bearing animals by proper protective laws and their enforcement.

ECONOMIC ORNITHOLOGY.

Article VII of the migratory-bird treaty between Great Britain and the United States reads as follows:

Permits to kill any of the above-named birds which, under extraordinary conditions, may become seriously injurious to the agricultural or other in-

terests in any particular community, may be issued by the proper authorities of the High Contracting Powers under suitable regulations prescribed therefor by them, respectively, but such permits shall lapse, or may be canceled at any time when, in the opinion of said authorities, the particular exigency has passed, and no birds killed under this article shall be shipped, sold, or offered for sale.

The administration of the act of enforcing the treaty as a consequence of this article has caused a notable increase in the demand for economic ornithological work. Numerous reports of bird depredations have been made, and in some of the cases investigated recommendations for the control of the species have been made, while in others the complaints proved to be without basis to warrant action. The incentive for large crop production incident to the war has been an added cause for the receipt of more than the ordinary number of complaints concerning bird depredations. - A policy of bird conservation that will best serve the interests of the farmer involves not only a thorough appreciation of the value of beneficial species, but adequate attention to the control of troublesome ones. Consequently, now that the beneficial species are fortified by ample protective legislation, the importance of perfecting methods for protecting crops against damage by birds becomes apparent.

FISH-EATING BIRDS.

Continuing the work started last year in investigating the food habits of fish-eating birds, field work was conducted in Florida to ascertain the relation of pelicans to the fishing industry. Claims had been made that these birds were responsible for the reduction in the numbers of mullet noted in recent years, as well as for the destruction of other food fishes. It naturally followed that the protection of the brown pelican in the breeding colonies, which are maintained as bird reservations, was criticized. The habit of young pelicans, in common with some of the other fish eaters, of regurgitating their food when disturbed, permitted the examination of the stomach contents of several hundred of them without killing a bird. Of the 814 fish found in the material examined only 9 (7 mullet and 2 red fish) were of species valuable as human food. By far the largest item, comprising over 91 per cent of the food, consisted of menhaden, a nonfood fish occurring in great abundance in the shallow waters about Florida and along the Gulf coast. Adult pelicans, however, are at times a nuisance about gill nets, where, in their attempts to secure the enmeshed fish, they tear the seines.

Reports of destruction of trout by mergansers, or fish ducks, in Michigan were investigated, but the mildness of the past winter presented conditions tending to keep these birds out of the smaller streams where the damage is usually done. This matter must be investigated under more nearly normal winter conditions to determine accurately the amount of loss from this source. A report on the economic status of all our fish-eating birds is nearly ready for publication.

NIGHT HERONS IN LOUISIANA.

In Louisiana the night herons had been charged with being a menace to the frogging industry, and for that reason permission was asked to shoot them, as had been done prior to the enactment of the migratory-bird treaty act. Louisiana is the only State wherein night

herons had ever been widely considered as legitimate game and a source of food. Among the French-speaking people of some sections the young of these birds are considered a great delicacy, and "gros-bec" hunting has been a favorite sport in the cypress swamps of La Fourche, Terrebonne, St. Marys, and neighboring parishes. An expert made a careful study of the birds in their haunts and after examination of a large number of stomachs reported that these birds are in no way a detriment to the frogging industry. It was proved that more than 96 per cent of the food in the stomachs of the night herons examined consisted of crawfish, and not a single frog was found. These birds were mainly the yellow-crowned species (*Nyctanassa violacea*), but previous examinations of stomachs of the black-crowned night herons showed that they had similar habits.

WHITE-WINGED DOVES IN ARIZONA.

Complaints by grain raisers of Arizona against the white-winged dove also necessitated investigation, chiefly in Maricopa County, where about 30,000 acres of wheat and barley had been planted. It was found that the doves were very abundant and that by far the greater part of their food was secured from the waste grain dropped among the stubble. The birds seemed to prefer feeding there even though shocks or stacks of grain remained in the same field. In small fields, especially those located near large breeding or roosting colonies, the damage is sometimes very serious. In such situations it will probably be necessary to permit the killing of birds actually damaging crops.

BLACKBIRDS IN OHIO.

A study of the food habits of red-winged blackbirds in northeastern Ohio, where sweet corn is grown extensively, determined the fact that these birds are a menace to the crop. The damage is of a most annoying character, as the attacks are made when the crop is nearly ready to harvest. The birds tear open the husks and feed on the terminal kernels, thus making the corn unsalable. Field corn also is similarly damaged. Effective control measures were devised for fields of small size and for garden patches, but for large areas more economical measures must yet be discovered. It has been found that with care and with proper baits strychnine may be used against blackbirds with very little danger to other wild or domestic bird life.

BOBOLINKS, OR "RICE BIRDS," AND THE RICE CROP.

A complaint coming from the lower Delaware Valley regarding depredations by bobolinks, "reedbirds," or "rice birds," was investigated and found to be without foundation, but a continuation of this investigation in the South Atlantic States indicated that these birds are as destructive to rice as ever wherever opportunity offers. On their northward migration they do great damage to newly-sprouted rice and on their southward journey they raise havoc with rice in the milk. Untold thousands of these birds swarm in dense clouds over rice fields, where they may ruin the crop in a few hours. It was found that the losses to rice growers from these birds in the fall of 1918 amounted to about \$150,000. In consequence of this an open season on bobolinks has been declared, which will have a tendency toward breaking up large flocks and reducing their num-

bers. In New Jersey, Pennsylvania, Delaware, Maryland, and the District of Columbia these birds may be shot from September 1 to October 30, inclusive, and in Virginia, North Carolina, South Carolina, Georgia, and Florida from August 16 to November 15, inclusive.

DAMAGE TO RICE BY WILD FOWL.

In the fall of 1917 many complaints were received of damage by wild ducks to the rice crop of the Sacramento Valley, Calif. Investigation was begun by an expert of the bureau as soon as the rice began to head the following August and continued until the harvest was well under way in October. Rice in this region is grown largely on low-lying and more or less alkaline lands unsuited for other forms of cultivation and therefore previously unutilized for agriculture. Considerable numbers of pintails and mallards breed in the marsh and slough areas, and late in summer many other birds congregate there, attracted by the water and food. On moonlight nights pintails come to the rice fields in large flocks to feed. Experiments were made with various means of driving out the birds. It was found that arming men with guns and stationing them in the fields was one of the best methods, supplemented by occasional aerial bombs that exploded among the birds and frightened them as they rose from the rice. As these ducks are protected under the migratory-bird treaty act, a special order was necessary granting permission to rice growers to kill them before the opening of the hunting season on October 16; after that date rice growers were permitted to shoot at night in fields still containing rice. These measures resulted in a saving of not less than \$125,000 worth of grain, while the number of ducks destroyed was nominal.

In November investigation was made of conditions in the rice district of Arkansas. Owing to unfavorable fall weather, probably two-thirds of the rice crop was unharvested as late as November 25. Migratory ducks, mainly mallards, were then arriving from the north and threatening serious damage. While the hunting season had opened, it was necessary to guard the fields at night, so that a special order had to be made under the migratory-bird treaty-act regulations, allowing rice growers to kill ducks at night.

MEADOWLARKS AND SPROUTING CORN.

The relation of the meadowlark to sprouting grain was a subject of field study in South Carolina. Reports received from most of the South Atlantic and Gulf States indicated that the food habits of the bird in the South were quite different from those it possesses in the North and that it was inflicting severe damage on sprouting corn. During March and April it was found that migrating flocks of these birds were spending a large part of their time in cornfields, feeding on the sweet germinating kernels, secured either by pulling up the sprouts or by making conical borings down to the grain. To afford farmers proper relief permission will have to be given them in certain areas to drive the birds from the fields with shotguns if necessary.

Similar complaints against mourning doves were not substantiated.

DESTRUCTIVENESS OF EAGLES.

From year to year definite and authentic reports are being received on the destruction of young fawns and wild turkeys, and even of young calves in some parts of the West, by golden eagles. Similar reports of the habits of both the golden and the bald eagle in relation to game come from Alaska. It is evident that these powerful birds are seriously destructive at times and their unlimited protection is probably not warranted.

IMMUNITY OF QUAIL AND GROUSE TO STRYCHNINE POISONING.

Important evidence has been secured regarding the comparative immunity of quail to strychnine poisoning. Field observations and feeding experiments conducted in California showed that one valley quail can eat grain containing enough strychnine to kill 12 ground squirrels without showing the slightest ill effect from the poison. A number of similar experiments on a mountain quail and a bob-white gave like results. The information thus gained will tend to allay fears in certain quarters that poisoning campaigns against ground squirrels result disastrously to these valuable game birds. Investigations in Saskatchewan, Canada, have proved that grouse are equally immune to strychnine poisoning.

FOOD HABITS OF OTHER BIRDS.

With a view to ascertaining the food habits of the vireos, examination of stomach contents has been continued and completed for all but one species; similar work has been started on the English sparrow, that its relation to constantly changing agricultural conditions may be known; and examination of the food of other species has progressed so far as a limited force permitted.

During the year two department bulletins were published, Attracting Birds to Public and Semipublic Reservations, and Food Habits of the Mallard Ducks of the United States, and several Farmers' Bulletins were revised. A report has been prepared on the food of winter-bird visitants, including the pine and evening grosbeaks, white-winged and red crossbills, hoary and common redpolls, pine siskin, snow bunting, the various longspurs, and the pipits. Another has also been prepared on the food of shoal-water ducks, dealing with the gadwall, baldpate, green-winged, blue-winged, and cinnamon teals, pintail, and wood duck. For educational purposes a lecture with lantern slides has been prepared on the value of birds to agriculture.

BIOLOGICAL INVESTIGATIONS.

The work of the Division of Biological Investigations has been seriously decreased, owing to the war. Two members of the scientific staff were commissioned in the Sanitary Corps and were in charge of rat-control work in France to safeguard Army supplies, and others were detailed to certain phases of urgently needed economic work.

As has been the case during past years, the field and laboratory work of the division has been conducted along broad lines helpful to the various other activities of the bureau. These activities include the enforcement of the migratory-bird treaty act; enforcement of the

Lacey Act regulating importations of, and interstate commerce in, birds and mammals; the administration of the mammal and bird reservations; general conservation of game birds and mammals; and work relating to the economic relations of mammals and birds to agriculture, forestry, and stock-raising.

The card indexes covering the distribution, abundance, and habits of all the species of North American mammals and birds have been greatly augmented during the year. These files contain data from many sources, including reports by field parties of the bureau, notes gleaned from correspondence and other outside sources, and records from publications.

DISTRIBUTION AND MIGRATION OF BIRDS.

Owing to war conditions fewer volunteer observers than usual reported on bird migration. However, 250 observers sent in reports from points throughout the United States and from many localities in Canada and Alaska. Considerable progress was made in compiling information from various publications on the distribution and migration of birds, adding materially to the files, which now contain more than 1,350,000 cards. This source of information is consulted daily in connection with the administration of the migratory-bird treaty act and the investigations of the economic habits of birds.

BIRD COUNTS.

Reports of the fifth annual series of counts of birds breeding on selected areas in various parts of the United States were received from 84 persons, who reported on over 100 different areas. Many of these counts, made on areas previously reported on, showed an increase in bird population. Owing to the unusual conditions throughout the country, on account of the war, many persons who had formerly taken part in the annual bird counts were unable to find time for this extra duty. With the gradual return of normal conditions, however, it is confidently expected that a large increase will occur in the number of these volunteer observers.

BIOLOGICAL SURVEYS OF THE STATES.

Good progress was made in the field work in Arizona, Florida, Montana, Washington, and Wisconsin, continuing the biological surveys which have been in progress during the past few years.

The "Mammals of Panama," one of the results of a cooperative biological survey of the Canal Zone in 1911-12, is about to be issued by the Smithsonian Institution. Works completed, but not published, include List of Mammals of New Mexico, The Mammals of North Dakota, The Mammals of Wyoming, The Birds of Texas, The Birds of Alabama, and The Birds of New Mexico. Negotiations are being conducted for the publication of the last three mentioned by the States to which the reports relate, and those on Alabama and New Mexico will probably be issued within a few months. A systematic study of the rice rats of North America was issued during the year.

BREEDING GROUNDS OF MIGRATORY WILD FOWL.

An investigation of the breeding areas of ducks in North Dakota, begun in June, 1918, was continued during July. * During June, 1919, the breeding grounds of ducks and other wild fowl in central Ne-

braska were investigated in order to compare the results with those found to obtain during former years. A gratifying increase of breeding waterfowl is evident in these States owing to the protection they have in spring under the migratory-bird treaty act.

WILD LIFE IN NATIONAL PARKS.

In cooperation with the National Park Service, Department of the Interior, investigations of the distribution, abundance, and habits of birds and mammals of Yellowstone and Glacier National Parks have been conducted during the past few years. During the fiscal year just closed revised reports on the birds and mammals of these two areas were published by the National Park Service in their educational literature; an elaborate report on Glacier National Park, comprising annotated lists of all the birds and mammals known to occur there, was completed during the year and was published by the National Park Service. A similar report on the mammals of the Yellowstone National Park has been prepared.

RELATION OF RODENTS TO FORAGE PRODUCTION.

In the spring of 1918 field investigations to secure information concerning the damage to crops and forage by injurious rodents were begun in several western States. By means of fenced and unfenced quadrats established on grazing areas where rodents abounded, studies of the damage inflicted by these pests were instituted. During the spring of 1919 a careful examination of these special areas was made and substantial progress in the elucidation of these problems has been effected. New quadrats were also installed. The results of this investigation will have great practical value in relation to forage on the western range lands.

MAMMAL AND BIRD RESERVATIONS.

The Federal big game and bird reservations in charge of this bureau, remain, as heretofore, 74 in number. Four are big game reservations; one, the Niobrara, created as a bird reservation, is used for both birds and big game; and 69 are bird reservations.

On June 30, 1918, the big game reservations contained a total of 368 bison, 274 elk, 54 antelope, and 21 deer, an increase in each species over the number reported last year.

The Government's seventh bison herd was established at Sullys Hill by the gift of the Park Commissioners of Portland, Oreg., of a nucleus herd of 6 animals. The Government's bison herds now aggregate about 950 head. Losses of antelope have been checked at the Wind Cave Reservation, S. Dak., and at the National Bison Range, Mont.

The number of visitors to the large game reservations is increasing, notably at Sullys Hill, Wind Cave, and at the National Bison Range. Trains on the new branch of the Northern Pacific Railroad from Dixon to Polson, Mont., now stop at Moiese close to the entrance to the main gate of the National Bison Range.

On the Gulf reservations arrangements were completed, as required by law (39 Stat., 1106), for assuming the full costs of warden service, formerly paid in part by the National Association of Audubon Societies. It became necessary also to purchase and maintain a patrol

motor boat at Big Lake Reservation, a service formerly provided by the Arkansas Fish and Game Commission.

Under the protection of the wardens, the useful birds on all the big game reservations have notably increased, but particularly on the National Bison Range and the Winter Elk Refuge, incidental to the protection of these reservations for mammals.

MAMMAL RESERVATIONS.

WINTER ELK REFUGE, JACKSON, WYO.—The main purpose of this reservation, which now has an inclosed area of 2,760 acres, is to increase the forage for elk by a limited amount of cultivation. The first cutting of hay is stacked and fed to the elk when there is no available pasturage, and the remainder is left to be grazed by these animals. Besides the hay raised, 2,103 bushels of oats were harvested from 56 acres, incidental to preparing ground for alfalfa. In the spring this area was disked and seeded, and in addition 140 acres having an inferior stand of alfalfa were dragged and reseeded to increase the yield of hay.

At the beginning of the year the hay on hand totaled 755 tons, 120 of which was cut in 1917 and 635 in 1918. Because of the light snowfall over the entire region, the maximum number of elk coming down at any one time to the refuge to be fed in the spring of 1919 was 3,000, as compared with a maximum of 10,000 for 1918. During 23 days of March (5th to 27th) 164 tons were fed to the elk, leaving a good supply on hand to supplement the harvest of this year. Some hay also was furnished by the State of Wyoming, and 25 tons of oat straw were fed to the elk.

No deaths from starvation were reported. A shortage of feed seems imminent for the coming winter, however, by reason of a severe drought. The drought has had the effect also of concentrating the ground squirrels around the irrigated areas, and as a result it has been possible to poison large numbers of them and thereby decrease their destruction of forage.

During the year somewhat more than 4 miles of new fencing was completed. The feeding corral built last year operated successfully and permitted segregating the young and weaker elk, thus protecting them from the main herd until they were fit to join it. Two cow moose visited the refuge on April 2.

The necessity for increased and definitely provided pasturage is immediate and imperative in order to deal justly with the settlers and to safeguard the existence of the elk. The precarious conditions surrounding the only two remaining large elk herds in the United States and a program for their conservation and for the action necessary to make them of the greatest value to the people are set forth in a department circular (No. 51), *Our National Elk Herds*, published in June in cooperation with the Forest Service.

NATIONAL BISON RANGE, MOIESE (NEAR DIXON), MONT.—The inclosed area of this reservation totals 18,521 acres. It is stocked with the following: Bison, 290 head (including 48 calves); elk, 125 (not including young; antelope 33 (not including young); and mule deer, 13 (not including young). Of the bison, one crippled bull died, and one young calf was killed by an accident.

Serious forest fires threatened the range in August and again in May. Seven hundred acres of young pines and spruces were de-

stroyed, but the fires were checked through the cooperation of the Indian and the Reclamation Services. Several incipient blazes were handled by the warden and assistants without serious loss.

Receiving basins 10 feet to 30 feet in diameter have been scooped out for conserving the water from the springs and making it accessible to the animals.

When the antelope "banded up" in the autumn the count disclosed but 32 as compared with 34 last year, probably the result of unlawful poaching in a remote part of the range. One doe was added by gift of the Oregon Game Commission.

WIND CAVE NATIONAL GAME PRESERVE, S. DAK.—In the 4,160 acres inclosed on this reservation, the big-game animals number as follows: Bison, 52 (including 12 calves); elk, 85 (not including calves); and antelope, 21 (including 7 young).

Thirteen coyotes (two of which were inside the inclosure) and seven bobcats have been killed this year. The scanty water supply has been increased by the development of the Ottman well.

SULLYS HILL GAME PRESERVE, N. DAK.—About 700 acres of this reservation are now inclosed and contain the following: Bison, newly established, 7 (including 1 calf); elk, 22 (not including calves); and deer, 6 (not including fawns).

NIORARA RESERVATION, VALENTINE, NEBR.—The big-game animals are at present held in two inclosures of about 200 acres each. The remainder of the reservation, about 4,500 acres north and about 9,000 acres south of the Niobrara River, is being inclosed in a stock-proof fence. The reservation is stocked with the following: Bison, 19 (not including calves); elk, 42 (not including calves); white-tailed deer, 2; Canada geese, 8. Pinnated and sharp-tailed grouse and other useful ground-nesting birds are increasing in numbers.

Two abandoned military structures are being salvaged for use in repairs of other buildings, and arrangements are being made for disposal under condemnation proceedings of the old "Administration Building."

A wire suspension footbridge has been built across the river, one dam constructed, and water from one spring conserved. By special efforts the prairie dogs were greatly reduced, possibly extirpated, thus saving considerable pasturage for the bison and elk.

BIRD RESERVATIONS.

On 10 of the 69 bird reservations, paid warden service has been maintained throughout the year, permanent warden service having been established at the Belle Fourche, S. Dak.; Big Lake, Ark.; and Strawberry Valley, Utah, reservations. At 8 other reservations part-time warden service is maintained during the nesting periods, the hunting season, or at times when serious trespass is likely to occur. Through the cooperation of the Reclamation Service, a general measure of protection is provided on most of the 19 bird reservations located within reclamation projects.

At the Minidoka Reservation, Idaho, a beginning has been made of making two islands of from 100 to 300 acres each, more attractive nesting and feeding places for useful birds, and important species of aquatic plants useful for food for waterfowl have been

introduced into Lake Walcott. Certain projected and necessary improvements could not be carried out on account of labor shortage.

At the Belle Fourche Reservation, S. Dak., permanent warden service has been provided, warden's quarters have been constructed, and a large area suitable for nesting and feeding places for wild ducks has been protected by fencing.

At the Big Lake Reservation, Ark., substantial progress has been made in locating, straightening, and defining the boundaries. Reports from various outside sources indicate that the reservation is now serving the purpose for which it was established.

At Deer Flat Reservation, Idaho, projected improvements were postponed on account of unsettled conditions.

At the Malheur and Klamath Reservations, Oreg., deplorable conditions exist on account of uncertainty concerning the status of certain lands embraced within these reservations. These conditions are under investigation, and it is confidently expected that both these reservations, which are of world-wide fame as natural breeding places for birds, and which should be unique and valuable assets not only for the immediate locality but also for the Nation, will be permanently preserved for the public benefit, and not be sacrificed for the temporary advantage of a few interested persons.

On the Hawaiian Islands Reservation a warden resident at Honolulu has been appointed to keep the bureau informed regarding conditions there.

The reservations in Florida are very inadequate to preserve what formerly was the most wonderful bird population of North America. The time when effective action is practicable is rapidly passing. With proper measures taken at once for establishing extensive refuges in southern Florida, one of the most wonderful assets of the State and of the Nation can be preserved from annihilation.

Reservations about the Mississippi delta were utilized during the year in securing material for a study of the effect of fish-eating birds upon commercial fisheries. A representative of the bureau visited the breeding colonies of Caspian terns and brown pelicans on the Breton and Tern Islands reservations in June; the latter reservation, near the Pass à l'Ouvre, is commonly known as the "Mud Lumps."

Increased protected areas suitable for breeding places for the migratory wild geese, ducks, cranes, swans, curlew, and shore birds should be provided. Additional wild-fowl refuges along the paths of migration are needed in order to secure improved and equalized opportunities for shooting wild fowl for food and for recreation, particularly in Iowa, Missouri, Kansas, and Illinois. All species of grouse and quail are also peculiarly subject to unnecessary and unwise depletion, which can best be minimized through reservations and provision of natural food supplies. The sage grouse requires special and immediate consideration.

There have been 28 convictions for violations of section 84 of the United States Criminal Code, prohibiting trespass on Federal bird reservations, with a number of cases still pending. Seven of these were for illegal shooting on the Malheur Lake Reservation, 19 on the Big Lake Reservation, and 2 on the Mosquito Inlet Reservation. It is hoped that these convictions will greatly strengthen respect for the law protecting the reservations.

THE MIGRATORY-BIRD TREATY AND LACEY ACTS.

The approval of the migratory-bird treaty act on July 3, 1918, to give effect to the treaty between the United States and Great Britain for the protection of migratory birds in the United States and Canada, concluded August 16, 1916, made possible the adequate protection of migratory birds in the United States. This act, which supersedes the migratory-bird law of 1913, contains many important provisions not found in the old law, especially those conferring on employees of the department appointed to enforce its provisions the powers of arrest, search, and seizure so necessary to its effective enforcement. Furthermore, the present act and the regulations thereunder contain many other new clauses covering the possession of migratory birds and the means by which they may be taken. It also provides for the collection and capture of birds for scientific and propagating purposes, as well as for the issuance of appropriate permits to kill any species of migratory bird found to be seriously injurious to agricultural or other interests.

The new law also supersedes the provisions of the Lacey Act with respect to the interstate shipment by common carrier of the dead bodies of wild birds and parts thereof, and adds new clauses prohibiting the shipment or carriage of living as well as dead birds—migratory and nonmigratory—out of a State by any means whatever contrary to the laws of the State in which the birds were killed or from which they were carried or shipped. The provisions of the Lacey Act relating to the delivery to a common carrier for transportation of foreign animals and birds, the interstate shipment of wild animals and parts thereof, and the penalty for knowingly receiving illegal shipments still remain.

The first regulations under the treaty act adopted by the Secretary of Agriculture became effective on approval by the President July 31, 1918. Amendments to these regulations were adopted and became effective October 25, 1918.

The designation "district inspector," applied to those appointed to enforce the migratory-bird law of 1913, was changed to "United States game warden," and the office of chief United States game warden for the administrative officer directly in charge of the administration of the treaty act was created when the act became effective.

For the first year this act was administered with a force of only 15 full-salaried game wardens, and 45 deputy wardens paid when actually employed. Much assistance and cooperation was rendered by most of the State game departments, and about 150 United States deputy game wardens were appointed from the deputy State game wardens, who received only a nominal salary from the Federal Government.

The wardens employed by the bureau reported for prosecution 531 violations of the law. Convictions have been secured in 116 cases, in which fines were assessed ranging from \$1 to \$100 and costs, and aggregating \$2,580. Of the remainder, 216 cases have been reported to the solicitor of the department for prosecution and are still pending; 5 cases have been dismissed by Federal judges; grand juries refused to return true bills in 15 cases, which probably will be resubmitted to grand juries or prosecuted by information; 79 cases are

still under investigation; and prosecutions were abandoned in 100 cases, due mainly to the fact that the violations were of a trivial character or the violators had already been convicted and adequately fined in State courts.

Convictions were secured in Federal courts as follows: Alabama, 28; Arkansas, 12; California, 4; Delaware, 1; Florida, 15; Georgia, 2; Idaho, 6; Illinois, 9; Iowa, 4; Louisiana, 1; Maine, 1; Maryland, 1; Minnesota, 2; Missouri, 4; New York, 3; Ohio, 3; South Carolina, 11; South Dakota, 1; Tennessee, 6; Texas, 1; and Virginia, 1.

Reports received to date show that 58 violators of both Federal and State laws were apprehended by United States deputy game wardens and were successfully prosecuted in State courts and fined an aggregate of \$1,918.75. The States in which these violations were prosecuted have thus benefited materially as a result of the cooperation of United States game wardens with State game authorities.

Wild ducks and other migratory birds of an approximate value of \$2,942.25 illegally killed or possessed, and aigrettes and plumes of other migratory birds of an estimated value of \$6,857.55 illegally possessed and trafficked in, have been seized. In most instances the birds seized which were fit for food have been released by the accused persons and donated to charitable or other public institutions and much of the plumage seized has been turned over by the courts or the accused persons to the bureau to be used for scientific and educational purposes. The remaining birds and plumes are being held as evidence to await disposition by the court.

During the year 621 scientific permits and 465 propagating permits were issued. The number of propagating permits issued does not approximate the number of persons who captured or possessed and trafficked in migratory waterfowl during the year for propagating purposes. The law is new and most persons possessing such waterfowl have not as yet become familiar with its provisions. The public is rapidly learning the requirements of the law, however, and is showing a gratifying desire to comply with them.

Marked progress has been made in breaking up the illegal traffic in aigrettes. Aigrettes in the United States are mainly the plumes of the American egret and snowy heron, which birds have been exterminated in many of the rookeries and greatly reduced in numbers everywhere by plume hunters, who wantonly kill the birds during the breeding season.

The treaty act and the regulations thereunder make it unlawful to possess, purchase, sell, or transport aigrettes or the skins or plumes of any migratory birds except under permit for purely scientific purposes, but the skins and feathers of migratory game birds lawfully killed may be possessed without a permit. The wearing of aigrettes and plumes of migratory birds other than the feathers of migratory game birds lawfully killed is thus made unlawful, and it is believed that women will refrain from wearing aigrettes or other prohibited plumage as soon as they have become familiar with the provisions of the law. The market for these plumes will then be closed and a check placed upon the indiscriminate slaughter of these beautiful birds for their plumage.

The extent to which this illegal traffic has been conducted was indicated when United States game wardens armed with a Federal warrant searched the apartment of a Seminole Indian at Miami, Fla.,

and seized aigrettes valued at about \$3,000. It is reliably stated that the yearly earnings of this Indian from the sale of plumes to Florida tourists and others have for several years exceeded \$5,000. The Indian is now under bonds to await the action of the Federal court.

The constitutionality of the migratory-bird treaty act has been upheld by Federal courts in Arkansas, Missouri, and Texas. These decisions have removed to a large extent the doubt existing in some quarters concerning the validity of the act, and have been a decided deterrent to those inclined to violate the law.

In Illinois, Ohio, South Carolina, and South Dakota legislation was enacted bringing the State game laws into practical uniformity with the provisions of the migratory-bird treaty act and the regulations thereunder, making a total of 28 States that have conformed their laws for the protection of migratory birds to the Federal law and regulations. The laws of three other States are nearly in harmony with the Federal regulations.

Many species of migratory birds have had a marked increase under the existing treaty act. Waterfowl formerly driven to the far north by spring shooting have remained in steadily increasing numbers to breed in localities where few or none had previously nested for many years.

State game commissioners, sportsmen, and others have extended cordial support and cooperation in the enforcement of the law, and the general opinion prevails that the treaty act properly enforced will restore our migratory game birds to such numbers as will continue to afford abundant legitimate sport. At the same time there will be an increase in the useful insectivorous and other migratory nongame birds.

INTERSTATE COMMERCE IN GAME.

The designation "district inspector, interstate commerce in game," was changed to "United States game warden" when the migratory-bird treaty act, approved July 3, 1918, became effective, and the enforcement of the provisions of the Lacey Act was delegated to all United States game wardens—15 in number—but 4 of these wardens, who had been previously assigned solely to Lacey Act work, were continued during the year in the enforcement of that law. The remainder of the wardens devoted their time mainly to the enforcement of the treaty act, but rendered incidental services in the enforcement of the Lacey Act.

The increased number of wardens performing Lacey Act work has resulted in greatly increased activity in the suppression of illegal interstate shipments of game. During the year special efforts were made to minimize shipments of beaver and deer skins and deer. In this the bureau secured the cooperation of many responsible concerns dealing in furs and game. The high prices paid for furs have encouraged some trappers to capture illegally and ship beaver skins to the market, but, as a result of the bureau's educational work in regard to the law, many firms dealing in furs have refused to purchase beaver skins or to receive shipments from States that have a continuous close season on beaver. Many of these firms have not only discontinued sending quotations to trappers in States which pro-

hibit the exportation of beaver skins, but have warned trappers not to consign to them beaver skins that have been illegally taken or shipped.

More than 1,000 interstate shipments of furs and game were investigated and 25 apparent violations of the Lacey Act were reported to the solicitor during the year. Of these violations, 12 were based on shipments which contained in the aggregate 27 carcasses of deer and 1,500 pounds of venison; 7 contained a total of 103 beaver skins; 2 contained 56 deerskins; 1 consisted of several shipments containing deer and elk hides; and 1 a shipment of aigrettes. Investigation of a large number of alleged illegal shipments is now in progress.

Violations of the Lacey Act reported for prosecution during the year to the solicitor originated in the following States: California, 1; Colorado, 1; Idaho, 1; Louisiana, 1; Maine, 5; Minnesota, 2; Montana, 2; New Hampshire, 4; Utah, 2; Vermont, 3; and Washington, 1. Twenty-three cases involving violations of the Lacey Act were disposed of in Federal courts. Seventeen prosecutions resulted in conviction of the accused and the payment of fines ranging from \$2 to \$1,000, the total amount of fines imposed being \$1,917. The other cases were not brought to trial.

Seventy-six cases, many of them involving the shipment of beaver skins, which for various reasons it seemed undesirable to prosecute in Federal courts, were referred by the bureau to State officials for prosecution in State tribunals. In 74 of these cases the accused were convicted and fines aggregating \$3,085 were imposed. One offender was sentenced to 90 days in jail and another was paroled.

IMPORTATION OF BIRDS AND MAMMALS.

War conditions during the first half of the year exerted a marked influence on the importation of birds from foreign countries. Although the armistice was signed on November 11, 1918, restrictions on shipments were not removed until some months later, and even at the close of the fiscal year normal conditions had not been restored, so far as the trade in birds was concerned. Ordinarily the number of permits issued for the port of New York exceeds that for any other port, but this year, even including the permits for birds from Central and South American countries, it amounted to less than 7 per cent of the total. Very few shipments were received from Europe although two or three lots of canaries arrived from Liverpool, London, and Rotterdam, the Rotterdam consignment being the first from Holland since the early days of the war. The parrot trade with tropical American countries, which forms an important item under normal conditions, has only recently begun to revive, as shown by the receipt of two considerable consignments from Nicaragua and Colombia.

The number of permits issued during the year decreased about 10 per cent, from 300 in 1918 to 273 in 1919, and the number of inspections from 76 to 42. Many of the permits issued were for the entry of foxes from Canada, the total number being 335, as compared with 391 in 1918. At Honolulu permits were issued for the entry of 195 birds, including pheasants, and several miscellaneous cage birds. So far as known, no prohibited species were entered during the year.

During the latter part of October and the early part of November, reports were received to the effect that a contagious disease was prevalent on some of the fox farms on Prince Edward Island, and the issue of permits for the entry of foxes was temporarily suspended pending an investigation. Through the cordial cooperation of the Canadian authorities, an examination of conditions promptly made disclosed the fact that the malady was local and noncontagious. The precaution had the effect of assuring importers that the Department realized the importance of protecting their interests and effectually guarding against the introduction of any contagious disease.

The increase in the number of shipments received at San Francisco was marked and included not only birds from the Orient and Australia, but also for the first time some direct from the island of Java. For the first time in 20 years, the number of canaries imported from the Orient nearly equaled the number received from European ports. As was the case last year, the receipts of miscellaneous non-game birds included a number of rare species, particularly from the Orient and from Venezuela. Among the most interesting entries were several shipments from Java, one of which included a number of jay thrushes, reported as *Garrulax pectoralis*. The consignment from Rotterdam, which arrived in April, contained in addition to canaries and other song birds, 12 species of waterfowl and shore birds, including a number of European green-winged teal, garganey or blue-winged teal, red-headed widgeon, and barnacle geese intended for exhibition in public zoological gardens or for propagation in private collections.

Among the rarer birds from Venezuela and Colombia were two Venezuela parrots (*Amazona barbadensis*), several bare-eyed robins (*Planesticus gymnophthalmus*), a puffbird (*Bucco bicinctus*), a cardinal (*Paroaria nigrogenis*), three black-necked screamers (*Chauna chavaria*), and several species of tanagers.

Reports of losses due to deaths among the birds en route were much more frequent than in any previous year. These were due in part to the long voyages from Australia and Java, but also to lack of care in handling the birds or packing them for shipment.

IMPORTATION OF QUAIL FROM MEXICO.

The regulations governing the importation of quail from Mexico remained in force without change during the past season, except that the time of entry was extended three weeks at the end of the season. The season was open in 1919 from February 15 to April 30. The ports of entry were the same as last year, Laredo and Eagle Pass, Tex., and New York City. Through cooperation of the Bureau of Animal Industry, the usual 10 days' quarantine was maintained at the two ports in Texas, and a thorough inspection of the birds was made during the period of detention. The first permit was issued January 8, 1919, and the number of quail for which permits were issued was 10,730, but the number released from quarantine was only 4,358, as compared with permits issued for 10,500 and the release of 5,205 in 1918.

Notwithstanding the fact that preparations were made long in advance of the season, both by importers and by several of the State game commissioners, to secure a large number of birds, the total number of quail secured was so small that only a fraction of the

orders could be filled. The long-continued drought in the Southwest, and particularly in the States of Coahuila and Tamaulipas, where most of these quail are captured, appears to have so reduced the number of quail that it was impossible to secure birds to meet the demand. Comparatively few birds held died during the quarantine period, and no case of quail disease was reported.

INFORMATION CONCERNING GAME LAWS.

The regular annual publications, including a directory of officials and organizations concerned with the protection of birds and game, the nineteenth annual summary of game laws, and a general poster showing open seasons for game in the United States and Canada, were issued and were widely distributed. The special poster showing open seasons in North Carolina, where a multitude of local laws apply to particular counties, has been discontinued. Copies of all changes in State laws relating to game were received, carded, and indexed for reference.

The Summary of the Game Laws of the United States and Canada for this year is the nineteenth annual publication of this bulletin. It is of widespread interest among sportsmen and conservationists and is of much practical service. An edition of 100,000 copies was required to meet the demand and supply the necessary distribution.

REPORT OF THE CHIEF OF THE BUREAU OF CROP ESTIMATES.

LEON M. ESTABROOK, *Chief of Bureau.*

WAR ORGANIZATION OF THE BUREAU.

The reorganization of the Bureau of Statistics and its change in title to Bureau of Crop Estimates in July, 1914, was coincident with the breaking out of the World War. It is fortunate that this reorganization was effected at that time, as the war, even before the United States took an active part in it, stimulated the demand for crop and live-stock estimates, estimates of surplus and deficiency of food and feed supply, consumption requirements, exports and imports of the United States and foreign countries, which the bureau could not have met with the old organization. The most important change involved in the reorganization of the bureau and the one which resulted in greatest improvement in the crop-reporting service was the appointment of trained field agents, one for each State or group of smaller States, who were in most cases legal residents of the States to which they were assigned, and whose interests were therefore closely identified with those of the people of the States in which their work is carried on, who travel over their States monthly during the crop season, personally observing and inspecting crops, interviewing the best informed men and enlisting their active cooperation in observing and reporting upon conditions for the monthly crop reports.

By the time the United States entered the war, in April, 1917, these field agents had become thoroughly familiar with local conditions and sources of information in their States, so that when the necessity arose

during the war emergency for obtaining dependable information quickly concerning present and prospective food supply, or any phase of crop and live-stock production for the use of the administrative officials of the Federal Government, it could readily be obtained within a few hours or days upon telegraphic request to the field agents. These requests, many of them urgent and without precedent, often involved an enormous amount of work on the part of the field agents, requiring them to work at all hours of the day and night, regardless of Sundays and holidays, but in every case they responded without complaint or hesitation, working conscientiously, efficiently, and loyally to do their part to help win the war. The same is true of the crop specialists, who are assigned to particular crops and collect information regarding their special crops wherever grown, without regard to State lines.

Not only did the war emergency develop the organization of the bureau to a high degree of efficiency of service, but it greatly stimulated the interest and zeal of the vast number of voluntary crop reporters, who serve without compensation. These men reported to the bureau on crop and live-stock conditions and in response to numerous special inquiries more conscientiously and with greater regularity during the war than before the emergency arose. In fact, one of the most inspiring features of our participation in this war was the universal readiness of every man, regardless of his situation in life, to contribute his time, thought, energy, and money, or make any other sacrifice required to help his country win the war against the common enemy.

On June 30, 1919, the bureau had 129 employees in the Washington office, and in the field 12 crop specialists, 39 field agents, and 50 clerks, or a total of 230 salaried employees.

The total number of voluntary crop reporters was 215,460, classified as follows:

Voluntary crop reporters.

List.	1919	List.	1919
Township.....	34,600	Potato.....	5,700
County.....	2,717	Sheep.....	6,446
County aids (estimated).....	5,434	Maple sirup.....	2,017
Field aids.....	25,042	Truck.....	10,000
Special price.....	7,664	Apple.....	9,500
Live stock.....	16,000	Peach.....	3,500
Mill and elevator.....	22,000	Rice.....	500
Individual farm.....	50,000	Tobacco.....	360
Special cotton.....	4,514	Pear.....	2,500
Cotton specialist.....	1,002		
Honeybee.....	5,964	Total ¹	215,460

¹ Exclusive of peanut, broom corn, bean, cranberry, and other special lists maintained by field agents.

For the fiscal year ended June 30, 1919, there was available \$346,232 from the annual appropriation and \$117,040 allotted from the war-emergency food-production appropriation, or a total of \$463,272.

WORK ACCOMPLISHED.

During the fiscal year ended June 30, 1919, the bureau issued the regular monthly crop reports, showing estimated acreages planted, growing conditions, yields per acre, and total production, farm prices of different crops for each State and the United States, estimates of total number of live stock of different classes on farms and ranges,

their condition, and losses from diseases and other causes. Commercial estimates of the apple and peach crops were made, and the weekly truck-crop news service was continued and extended. Many special inquiries were made during the year, including:

Quantity of commercial fertilizers used per acre of cotton and proportion of fields upon which used.

Percentage of various crops to which commercial fertilizer and manure was applied and quantity used per acre.

Binder twine requirements for the grain crops of 1918 for the use of the Grain Corporation.

Emergency live-stock survey, to determine the number on farms July 1, 1918.

Uses made of wheat crop, for the United States Food Administration.

Quantities of various crops fed to different classes of live stock.

Live-stock survey of January, 1919.

Fertilizer inquiry of January, 1919, to ascertain quantity of commercial fertilizers and manure used for various crops.

Wages of farm help.

Prices farmers pay for equipment, machinery, and supplies.

Percentage of farm labor requirements available.

Field agents prepared estimates of acreage, yield, production, and stocks on farms of wheat and corn by counties for the United States Grain Corporation, and they also prepared estimates of the value of agricultural production by counties in each of the principal States for the use of the Treasury Department. Field agents cooperated with officials of the Department of Agriculture, the Treasury Department, and the State extension services in the States where seed-grain loans were made to farmers in the drought-stricken regions of the Northwest and the Southwest in the fall of 1918 and spring of 1919.

The bureau compiled innumerable statements showing the production, consumption, surplus and deficiency, exports and imports, and prices of important agricultural products for all the principal countries before the war, and of production and requirements during the war, for the information of administrative officials of the Department of Agriculture, of other Federal departments, and various war-emergency organizations. Many of these statements were for the use of the department committee on crop production and were used as a basis for the crop-production programs which were recommended. Other compilations were made for the confidential use of the War Trade Board and for the Committees on Agriculture in Congress.

Summaries of weekly reports of the State field agents of the bureau were furnished for the confidential information of the Secretary and chiefs of bureaus of the Department of Agriculture, and after the signing of the armistice the mailing list for these summaries was extended to include other Government officials and Senators and Members of the House of Representatives. Bimonthly foreign crop reports were issued in the spring of 1919 and will be continued.

A vast amount of information was compiled and furnished in response to inquiries received by telephone, telegraph, letter, or personal call of representatives of the Food Administration, the War Trade Board, the War Industries Board, the Military Intelligence Office of the War Department, the Tariff Commission, the Federal Trade Commission, the Council of National Defense, other departments of the Federal and State Governments, Congress, and private individuals. The statistical library of the bureau was in constant use by such representatives. The limited clerical force of the bureau was taxed to the utmost in compiling and tabulating statements and furnishing information urgently needed for immediate use.

More than 4,000,000 pieces of mail were handled by the Division of Crop Reports during the year, as compared with 3,200,000 by the same division for the preceding fiscal year, an increase of 25 per cent. About the same relative increase was noted in all other branches of the bureau at Washington.

In the State offices of field agents the work more than doubled in the fiscal year 1919 as compared with the preceding year. The issuance by field agents of monthly State crop reports bearing their names which are generally reproduced in all the State papers has made them widely known throughout their States and has resulted in a heavy volume of correspondence. Many of the field agents are becoming more and more recognized among business men and

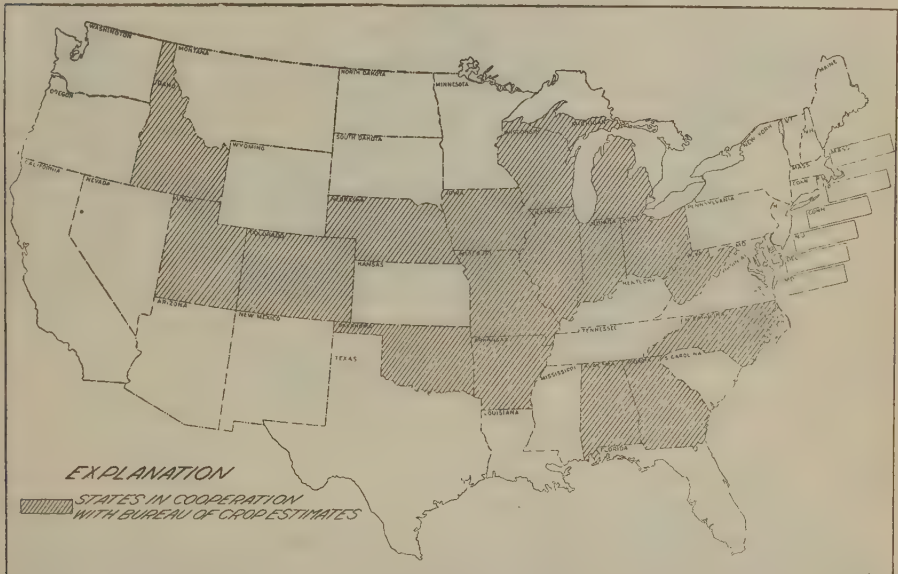


FIG. 1.—The shading indicates States cooperating under formal agreements with the Federal Bureau of Crop Estimates in the collection and dissemination of monthly estimates relating to crops and live stock.

Cooperative agreements are under consideration in several States not shaded in the above map, and partial cooperation exists in some others as a result of mutual interest.

officials of the State governments and State institutions as the best authorities on the statistics of agriculture in their States, so that the practice is growing of referring correspondence calling for statistical information to the field agent of the Bureau of Crop Estimates. A considerable number of requests for information regarding localized production within a State, such as special crops or county estimates, are regularly referred by the Washington office of the bureau to the State offices of field agents. The steadily increasing demand for detailed information which can be furnished only by the State field agents indicates the need for providing them with adequate office space, equipment, and clerical assistance.

COOPERATION WITH STATE DEPARTMENTS OF AGRICULTURE.

During the fiscal year just closed cooperative agreements were entered into between the Bureau of Crop Estimates and the State

departments of agriculture of Arkansas, Georgia, Alabama, North Carolina, West Virginia, Illinois, Iowa, Oklahoma, and Idaho. These agreements provided for pooling the crop reporting resources of the two organizations and the issuance of a single cooperative monthly State crop report in order to avoid unnecessary duplication of work and expense and to improve the service. This plan of combining the force and funds of the bureau with those of State departments of agriculture has proved highly satisfactory in all States in which it has been tried. The shaded portions of figure 1 show the States with which the bureau is now cooperating.

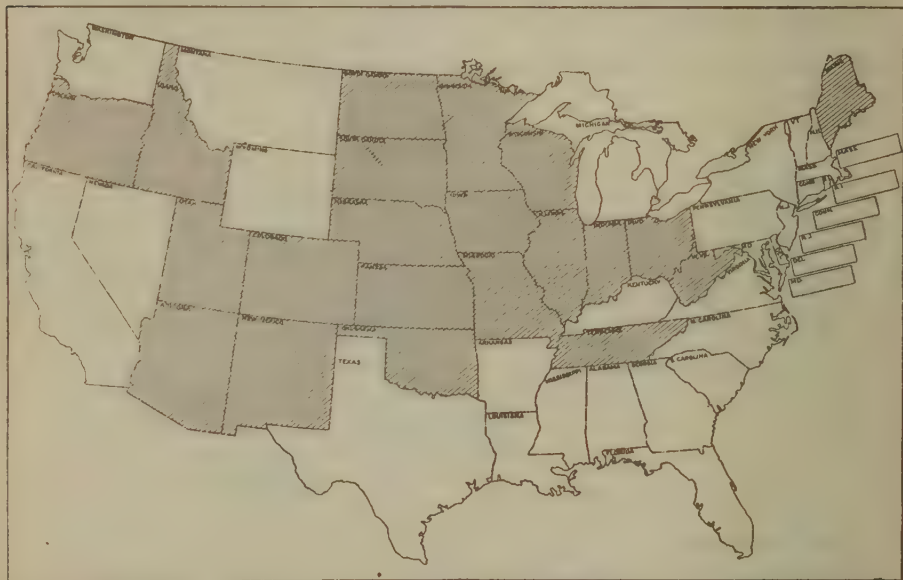


FIG. 2.—The shaded portion indicates States requiring assessors to gather agricultural statistics from farmers annually, including generally acreages planted to specific crops, numbers of bearing fruit trees, numbers of live stock, and other statistical information relating to agriculture. This information has no bearing on taxes, but is of the utmost value to the State and Federal agricultural authorities, not only as a basis for accurate monthly crop estimates for the information of producers and business men, but in agricultural and marketing plans of which such information must necessarily form the base. In addition to the States shaded, which have laws for the collection of statistics by assessors, North Carolina assessors are proceeding to gather the information in advance of the enactment of such a law. Florida has legislation providing for biennial censuses. In practically all States the tax assessors make an annual census of live stock.

STATE ASSESSORS' RETURNS.

In a number of States the efficiency and value of assessors in collecting agricultural data of fundamental importance in crop and live-stock estimating, such as acreages planted to different crops and the number of live stock of different classes on all farms within the State, has been fully demonstrated, notably in Wisconsin, Ohio, Nebraska, Iowa, Kansas, and Missouri. The bureau is, therefore, systematically encouraging the use of assessors' returns as a basis of estimating and is cooperating with State officials to see that proper steps are taken to insure that the returns shall be complete and that they shall be properly edited and tabulated so that dependable

results will be available before the final estimates of acreage and production are issued for publication. When so checked for completeness and correctness, assessors' returns of agricultural data, which have no connection whatever with taxation, form an annual census of the greatest value. During the winter and spring months of 1918-19 a number of State legislatures amended old laws or passed new laws providing for the collection of agricultural data by assessors. The States which now have such laws are shown in the shaded portions of figure 2. It is hoped that all States will join in this movement to ascertain accurately the agricultural resources of each county and State annually.

ACCURACY OF THE CROP ESTIMATES.

The value of the crop and live-stock estimates depends upon their accuracy and timeliness, and the amount of detail. The degree of accuracy of the estimates can be determined only approximately for most crops, by checking against such figures as are available for crop movement, receipts at primary markets, and exports. In the case of the cotton crop, however, an absolute check is afforded by the annual census of the number of bales ginned. The following table shows the annual estimates by this bureau in December in comparison with the annual report of bales ginned by the Bureau of the Census the following March:

Annual cotton estimates of the Bureau of Crop Estimates, compared with annual Census reports of cotton ginned.

Crop year.	Pounds of cotton (000 omitted).		Over estimated.	Under estimated.
	Estimated by Department of Agriculture.	Finally reported by Census Bureau.		
1900-1.	4,856,738	4,846,471	<i>Per cent.</i> 0.2	<i>Per cent.</i>
1901-2.	4,529,954	4,550,950		0.5
1902-3.	5,111,870	5,091,641	.4	
1903-4.	4,889,796	4,716,591	3.7	
1904-5.	6,157,064	6,426,698		4.2
1905-6.	4,860,217	5,060,200		4.0
1906-7.	6,001,726	6,354,110		5.5
1907-8.	5,581,968	5,312,950	5.1	
1908-9.	6,182,970	6,336,070		2.4
1909-10.	4,826,344	4,783,220	.9	
1910-11.	5,464,597	5,551,790		1.6
1911-12.	7,121,713	7,506,430		5.1
1912-13.	6,612,335	6,556,500	.9	
1913-14.	6,542,850	6,772,350		3.4
1914-15.	7,637,113	7,718,980		1.1
1915-16.	5,338,588	5,354,406		.3
1916-17.	5,506,896	5,480,012	.4	
1917-18.	5,237,379	5,406,350		3.0
1918-19.	5,595,529	5,760,184		3.0
19 years, 1900-1919.	108,055,647	109,585,903		1.4
5 years, 1914-1919.	29,315,505	29,719,932		1.4
3 years, 1916-1919.	16,339,804	16,646,548		1.8

It will be noted that the bureau estimated the cotton crop of 1915 within three-tenths of 1 per cent, the crop of 1916 within five-tenths of 1 per cent, the crop of 1917 within 3.1 per cent, and the crop of

1918 within 2.7 per cent of the final ginning figures. The wider deviation in the estimate of the 1917 crop was due to the price of cotton in the winter of 1917-18, which made it profitable to pick closer than had ever been done before, the picking continuing as late as February and March in some States. The underestimate of 1918 was due to the comparatively mild winter, which made it possible for more bolls to mature than could be foreseen by the growers, and prevailing prices made it profitable to pick all that opened. The practice of harvesting "bolly" cotton—i. e., unopened bolls—has gradually extended throughout the cotton belt because of the demand for cotton and relatively high prices.

In 1918 for the first time the bureau had a fairly complete check on its estimates of wheat production, afforded by the records kept by the United States Grain Corporation. At the close of the fiscal year the Grain Corporation had reported approximately 730,000,000 bushels of wheat received from farms. The 1918 crop as estimated by the bureau was 917,000,000 bushels, with 8,000,000 on hand July 1, 1918, from the previous crop, making a total of 925,000,000 bushels available. Of this amount approximately 105,000,000 bushels were used for seed, 25,000,000 bushels of damaged or inferior grain is normally fed to poultry and other live stock, and after deducting the 730,000,000 reported by the Grain Corporation as marketed from farms, there is left 65,000,000 bushels to be accounted for. It should be remembered that the Grain Corporation gets no reports of wheat ground in mills of small capacity, which includes many small country grist mills in every State in which wheat is grown and consumed locally, the annual capacity of which is far in excess of 65,000,000 bushels. Apparently the bureau underestimated the 1918 wheat crop slightly, perhaps as much as 2 per cent. In all probability the estimates of the United States wheat crop were about as accurate as an agricultural census by ordinary methods.

DEMANDS FOR IMPROVED CROP AND LIVE STOCK REPORTING SERVICE.

The war emergency not only demonstrated the efficiency and the value of the crop-reporting service but also showed the need for improvement to meet continuing demands upon the service, which can only be partially met with the present force and funds. These demands may be classified as follows:

(1) The demand for estimates and forecasts of the consumption, market, export, and import requirements and available surplus of agricultural products, not only in this country but in foreign countries as well. This information is needed as a basis for intelligent planting and marketing programs, the importance of which was fully demonstrated during the war and will continue to be of equal importance in the years to come, as population increases without a corresponding increase in arable land in this country, and as competition develops with foreign countries.

(2) The demand for information in advance of planting time or while planting is in progress as to acreage to be planted to crops, in order that any prospective surplus or deficiency may be equalized by modifying later plantings in accordance with prospective supply and demand. Estimates of farmers' intention to plant were made in

the spring of 1917 and 1918 for the information of the administrative officers of the Government, and came very close to final estimates.

(3) The demand for crop and live-stock estimates by counties. This demand developed prior to the war, and during the war it became more and more insistent. The bureau has realized the desirability of making its estimates by counties as well as by States to meet the growing demand for such information, but has been unable to shift from a State to a county basis (a) because of the time that has elapsed since the last census by counties, during which intervening period great changes have occurred in many States; (b) because of the enormous increase in detailed work involved in changing from estimated totals for 48 States to estimates for nearly 3,000 counties; and (c) because of inadequate funds and force, which would not permit of further expansion of the service. However, during the war period, with such emergency funds as were available, it was found practicable to change more or less completely from a State to a county basis in six States and to make a beginning in a considerable proportion of the others, the change being made in the offices of the field agents for those States. The details of the county estimates are published in the State reports issued by field agents and not in the Monthly Crop Reporter published at Washington. During the present fiscal year all field agents will attempt to collect and tabulate data by counties, so that following the 1920 census the entire system of crop reporting will be on a county basis, if sufficient funds are provided by Congress to enable the bureau to consummate this plan. County estimates localize crop and live-stock data so as to be of more practical use than mere State totals, and such localization tends to increase the accuracy of the reports. They show the agricultural resources and production of each county, as well as surplus and deficiency of supply; equalize distribution; facilitate marketing; enable transportation companies to supply cars needed for moving surplus crops, and manufacturers and merchants to provide farm machinery and supplies when and where needed; and form the basis of much of the constructive work of the agricultural colleges and county agents.

(4) The demand for "commercial" crop and live-stock estimates. i. e., estimates of marketable farm surpluses, which is the portion of the crop that is sold from the farm, enters the channels of trade, becomes a part of the visible supply, and influences prices, has also developed to a point where provision should be made for supplying it. For half a century the bureau has been estimating total crop and live-stock production, which includes not only the portions of the crops which are marketed, but the portions which are fed, consumed, damaged, lost, wasted, or utilized in various ways on the farm. It is necessary that total production should continue to be estimated, because it is the basis of commercial production, the proportion of the total which is marketed varying with market demands and prices. On the other hand, it is the commercial production or marketable surplus which makes up the commercial or visible supply and in which producers, consumers, and distributors are alike interested. Dependable information concerning commercial production of farm commodities is essential to any enlarged program of market-

ing. To meet partially the demand for estimates of commercial production, the bureau has at various times estimated the percentage of total production of certain crops in each State that is marketed for each month of the year. In the case of apples, peaches, and truck crops, these estimates have been published in terms of bushels, barrels, crates, or car lots. In the spring of 1919 a program was prepared for estimating the commercial production of the late crop of white potatoes. Commercial estimates involve a rather intensive survey of the principal areas of commercial production, the organization of a special corps of crop reporters, and the employment of crop specialists who are familiar with the industry and can devote their entire time to collecting, summarizing, and interpreting data regarding the particular crops in such form as to be of practical use to growers and to the marketing agencies.

(5) Reserve stocks on farms. A further development of the increased interest in the food supply during the war period has been the demand for information concerning reserve stocks on farms. This is closely related to the demand for information regarding commercial production or marketable surpluses on farms, but it takes the form of requests for information as to the portion of the total marketable surpluses that remains unsold on farms at frequent intervals. This information is essential in connection with estimates of visible supply, that is, stocks of farm products in public and private warehouses, mills and elevators, in transit, and in factories and wholesale establishments. If the bureau were provided with adequate funds, it would be entirely practicable to furnish such estimates monthly. In the past it has been practicable to make such estimates for only a few crops annually. The program for commercial potato estimates provides for estimating stocks of potatoes on farms monthly throughout the year. A similar program should be developed for other crops.

(6) New crops. Much interest was also manifested during the war and since the war in estimates of new crops, or rather crops concerning which dependable data were lacking, such as castor beans, or phases of production, demand for and supply of farm and forest products, such as rosin, turpentine, cotton linters, sorghum sirup, soy beans and velvet beans, and the vegetable oils.

(7) Live stock. No phase of crop estimating has been less satisfactory than the live-stock reporting service by reason of its inadequacy. Because of lack of funds and facilities, these reports have been limited to estimates of the number of animals on farms once a year, the percentage of losses from disease and exposure annually, the condition of live stock on a percentage basis, and the number of brood sows, without any estimates whatever of milk, butter, cheese, poultry and egg production. The live-stock industry is worth approximately \$10,000,000,000, and yet the bureau has had less than \$50,000 available for reporting upon all classes of live stock. The expenditure of \$500,000 annually would be fully justified in furnishing satisfactory monthly reports covering number, condition, age, sex, and breed of different classes of live stock, and of dairy and poultry production, slaughter, losses from disease, insects, exposure, and other causes, farm prices, present and prospective supply of feed, and similar data. Such estimates can be furnished for half the

amount named and would be of untold value to the industry, because definite, detailed, and timely data would be available which would enable growers to decide intelligently upon long-time programs of production, how and when to sell, and how best to take advantage of the feed situation. Such data are also essential to any program of crop production which involves live stock as a part of the farm-management program, and are absolutely necessary as a guide to intelligent marketing and distribution of live stock and live-stock products. With the limited funds at its disposal the bureau has endeavored to meet the increasing demand upon it for live-stock information, with an ever-increasing realization of the inadequacy of the present live-stock reporting service and of the funds and force available for improving the service.

(8) Special phases of agriculture. The war also stimulated interest in special phases of agriculture, and many requests continue to be received for information on farm wages; hours of farm labor; prices farmers receive for their products; prices farmers pay for equipment, machinery, and supplies; progress of farm work; amount of binder twine required; seed requirements, supply, surplus, and deficiency; number of farm tractors; number of silos; storage capacity on farms; average distances farmers must haul products to nearest market or shipping station; kinds and quantities of fertilizers required for different crops and sections of the country; farm income and outgo; extent to which particular varieties of crops are grown and compete with each other; methods of planting, cultivating, and harvesting crops, which are different in different States; utilization of different crops; and similar information bearing on crop and live-stock production as an industry. Requests of this nature are received largely from special investigators employed in other branches of the Department of Agriculture or in the State agricultural colleges and experiment stations, from legislators, representatives of farmers' organizations, and of the press. The bureau was able to furnish much of this information during the war from results of former special inquiries or to secure it from new investigations. With the reduced appropriation available in the present fiscal year it will be impracticable to make additional investigations of this kind.

(9) Foreign crops and live stock. Interest in the foreign crop and live-stock situation during the war was unprecedented in this country. The demand for information concerning consumption, production, import and export of food crops in Europe, and the available supply in countries of surplus production was constant and is continuing. The bureau files of reports from the International Institute of Agriculture and the published and unpublished statistical reports of foreign Governments were consulted almost daily by representatives of other Government departments and war-emergency organizations. Detailed studies were made by specialists of this bureau for the use of economists who accompanied the peace commission to Paris. Estimates of food requirements of foreign countries, their reserve stocks, production and net imports, were essential factors considered by the department's committee which had charge of formulating programs of production in this country during the war. Continued interest in world production and consumption indicates the need for more systematic periodic reports as a guide to production and marketing in this country.

The foregoing indicates some of the principal classes of calls upon the Bureau of Crop Estimates for information in 1917 and 1918. Fortunately the bureau had a highly specialized skeleton organization and through long experience had developed an efficient system for estimating quickly the production and supply of most agricultural commodities in this country and abroad. The additional funds provided out of the war-emergency appropriation for stimulating food production enabled the bureau for the first time to supply the offices of its State field agents with some of the most necessary equipment and with field clerks, without which it would have been impracticable to do more than continue the regular crop estimates on a prewar basis. The war emergency demonstrated the efficiency and value of the crop-reporting service, not only in time of war but still more in time of peace, as an organization for ascertaining and summarizing the essential facts of crop and live-stock production which are necessary for the guidance of farmers, and for the formation of intelligent plans of production and marketing. This service is of such great practical and economic value to agriculture as an industry which is and always will be of fundamental importance in the United States, that the service should be greatly expanded, developed, and specialized in the future.

REPORT OF THE DIRECTOR OF THE STATES RELATIONS SERVICE.

A. C. TRUE, *Director.*

INTRODUCTION.

The States Relations Service represents the Secretary of Agriculture in his relations with the State agricultural colleges and experiment stations under the acts of Congress granting funds to these institutions for agricultural experiment stations and cooperative extension work in agriculture and home economics, and in carrying out the provisions of the acts of Congress making appropriations to the Department of Agriculture for farmers' cooperative demonstration work, investigations relating to agricultural schools, farmers' institutes, and home economics, and the maintenance of agricultural experiment stations in Alaska, Hawaii, Porto Rico, Guam, and the Virgin Islands.

The organization of the service includes the following offices: (1) The Office of the Director, which deals with the general business and administration of the service and the work relating to agricultural instruction and farmers' institutes; (2) the Office of Experiment Stations; (3) the Office of Extension Work in the South, including the farmers' cooperative demonstration work and the cooperative extension work in 15 Southern States; (4) the Office of Extension Work in the North and West, including the farmers' cooperative demonstration work and the cooperative extension work in 33 Northern and Western States; and (5) the Office of Home Economics, including in-

vestigations relative to foods, clothing, and household equipment and management.

During the past year the service continued to have charge of the work authorized by Congress in the item in the food-production act of August 10, 1917, providing "for increasing food production and eliminating waste and promoting conservation of food by educational and demonstrational methods through county, district, and urban agents and others." A war emergency fund of \$6,100,000 for this purpose was used through the two extension offices for the expansion of the work of the county agricultural agents, home demonstration agents, and boys' and girls' clubs.

The service directly administered regular and emergency appropriations aggregating \$7,304,940, and had administrative and advisory relations in the expenditure of \$4,020,000 of Federal funds (\$1,440,000 for agricultural experiment stations and \$2,580,000 for cooperative extension work) and \$2,100,000 of State funds used as an offset for Federal funds under the cooperative extension act. In addition, the agricultural colleges and experiment stations used in experimental and extension enterprises over \$8,750,000 derived from sources within the States.

In the fiscal year 1918-19 the force carried on the rolls of the States Relations Service aggregated about 7,000 employees. The total number of persons employed in cooperative extension work in agriculture and home economics was about 7,500. Over 2,400 counties had agricultural agents and about 1,700 counties and 200 cities also had home demonstration agents. About 2,000,000 boys and girls were connected with the agricultural and home economics clubs. In the fiscal year 1917-18 the State agricultural experiment stations employed 1,684 persons, of whom 449 did some extension work.

Up to the signing of the armistice the service was busily engaged in aiding the State and county extension forces and through them the farmers throughout the country in increasing agricultural production to meet the war needs, and both country and city people in conserving the products and making most economical and effective use of available supplies. During the remainder of the year special attention was given to the problems of agriculture and household economy growing out of the discontinuance of military operations and the beginning of adjustment to meet conditions arising in the settlement of world affairs after the war. An effort was also made by the extension forces to perfect and establish on a permanent basis the cooperating agencies among the farming people, in order that the extension work might rest more securely on the initiative and active participation of the people themselves.

Uncertainty regarding the policy which would finally be adopted in making grants of Federal funds in lieu of the war-emergency appropriations made it impracticable to determine definitely the amounts of State and local funds which would be required to maintain the existing organization and work in the several States and localities. For this and other reasons the fiscal year closed without settlement of important problems regarding the continuance of various agencies and methods for extension work on the scale on which they had been organized in war time. It is now evident, however, that the system of extension work extended so rapidly under war conditions has commended itself to the people in very large

measure as a thing which will be useful to them in times of peace. They are therefore making strong efforts to maintain it by local contributions, as far as these are needed to supplement Federal and State funds. The number of counties in which it has been necessary to withdraw the agricultural agents is much smaller than was anticipated. Several hundred home demonstration agents have been discontinued. But there is a general feeling that in a comparatively short time the extension forces will be as numerous as ever and that the system will continue to grow until it covers the entire country.

The close of the war has brought the agricultural experiment stations in the States back more completely to their fundamental work of agricultural research. The changes in their activities and personnel during the war have necessitated considerable reorganization of their forces and projects. In this readjustment work the Office of Experiment Stations is giving them as much assistance as possible. The experiment stations maintained by the service in Alaska and the insular territories are continuing both research and extension work, taking advantage of the increased interest in the agricultural development, due to the imperative demand which the war brought about, to make those regions more self-supporting.

The Office of Home Economics, through participation in the food survey conducted by the Bureau of Markets and in the work of various war-time agencies dealing with problems of the conservation and utilization of agricultural products, has gained and disseminated much valuable information which will serve as a basis for research needed in connection with teaching and extension work in home economics.

The movement of events growing out of the war has greatly stimulated the interest of our people in vocational education. One result of this has been that the department has been called upon in increased measure to furnish the up-to-date information and illustrative material in agriculture and home economics which the schools need to make their work in these lines most effective. The States Relations Service has done what it could to aid the schools in developing satisfactory courses of instruction in these important branches.

OFFICE OF THE DIRECTOR.

EDITORIAL DIVISION.

W. H. BEAL, *Chief*.

The work of this division included the business connected with (1) the editing of all publications of the service except Experiment Station Record, and (2) the collection, preparation, and distribution of illustrative material.

There was a decrease in the number of different publications issued during the year, but many of them, especially those bearing on food production and conservation, were printed in large editions to meet emergency demands, so that the number of copies was greater than in previous years. The publications issued included 64 documents aggregating 3,997 pages, as follows: Nineteen numbers of Experiment Station Record, 2 reports, 6 technical bulletins (2 relating to work in agricultural education and 4 to investigations in home economics), 1 article in the Journal of Agricultural Research, 10 publications of the insular stations, 2 popular lectures (with lantern

slides), 20 documents relating to cooperative extension work in agriculture and home economics, and 1 general administrative circular. In addition to these more formal printed documents the service issued either in printed or in mimeographed form a number of other documents, including leaflets of various kinds, report forms, record books, and the like, required in connection with special features of the work of the service, and cooperated with the Office of Information in the preparation of press and other informational material of wider general interest relating especially to the promotion of increased production, conservation, and economical use of food and the organization and development of the cooperative extension work.

ILLUSTRATIONS SECTION.—This section was in charge of Reuben Brigham. There was a marked increase in the work of the section connected with the collection and preparation of illustrative material for service use. An increased number of photographs taken either by our own force or in cooperation with the Division of Publications was added to the collection, which now contains about 10,495 photographs, 7,826 of which are mounted, classified, and catalogued for ready use. Over 1,500 new photographs were added to the collection during the year.

The total number of lantern slides made was 15,253, of which 3,153 were colored. The section organized several new series of lantern slides for special purposes, particularly for the use of extension specialists, county agents, or other workers cooperating or collaborating with the service. It is developing in this way a flexible collection of slides that may be adjusted to meet a large variety of local needs and conditions. The division continues to make a special feature of lantern-slide color work with the result that it now has a considerable collection of colored slides of unusually high quality. In addition to the coloring of lantern slides some attention is being given to the coloring of bromide enlargements.

The methods of handling the illustrative material, particularly lantern slides, were also improved. There were lent during the year, mainly to extension workers and schools teaching agriculture, 1,346 sets aggregating 67,300 slides. The demand for this service has increased rapidly.

Work in the preparation of charts and drawings for service use progressed rapidly during the year as a result of the employment of a competent artist to give full time to such work.

The section cooperated with other offices of the service and with the Office of Exhibits of the department in planning and preparing a representative exhibit of the work of the service for use in connection with the general department exhibit for State fair circuits. The section also cooperated with other offices of the service and with the assistant in charge of motion-picture activities in outlining and staging two films illustrating cooperative extension work, one in Florida, illustrating home-demonstration work in the South, and the other in Maryland, illustrating cooperative extension work and organization in relation to improving methods of apple production.

Several mimeographed circulars explaining how to make good photographs, lantern slides, and charts for extension and school use were issued.

INVESTIGATIONS ON AGRICULTURAL INSTRUCTION IN SCHOOLS.

ALVIN DILLIE, ¹⁸*In charge.*

Particular attention was given during the year to the preparation of subject matter in form for use in teaching vocational agriculture in secondary schools, and to plans for training teachers for these schools. At the same time the elementary rural school studies were not neglected.

Previous to the signing of the armistice there was cooperation with other divisions and bureaus in promoting instruction relating to problems of food production and conservation. Studies were made of the training of unskilled farm labor and of city boys to do farm work. Studies of the educational work of the colleges with the Students' Army Training Corps, especially the instruction in agriculture being given to these men, were also begun. Sets of lantern slides, charts, and reference material were supplied to instructors in agriculture at various army camps. The signing of the armistice brought a sudden end to this special war work, and after that time attention was turned to problems of readjustment in agricultural teaching.

The preparation of material in the form of bulletins, circulars, leaflets, etc., for the use of teachers of agriculture continued to receive a large amount of attention. Lessons in dairying and on potatoes for rural elementary schools were published in bulletins which were widely distributed. Twelve leaflets on how teachers may use certain Farmers' Bulletins were also printed and distributed. Owing to an increased demand for material for use in schools teaching agriculture a number of earlier bulletins were reprinted.

The preparation of a two years' course of study for negro vocational schools was undertaken in cooperation with the Federal Board for Vocational Education. The first year's course, lessons in crop production, was completed and turned over to the Federal Board, and the preparation of the second-year course, lessons in animal production, was well advanced. A conference was conducted at Hampton Institute with negro teacher trainers and supervisors of agriculture, at which the first course was carefully reviewed and explained.

While the war checked in some measure the development of instruction in agriculture, the interest in agriculture was greatly increased by the emphasis placed on food production and conservation. With the close of the war State authorities began to turn their attention to the development of the agricultural schools, more especially those teaching vocational agriculture. This was shown by the increased demand for material that would help in the solutions of their teaching problems.

The demand for help in visual instruction was in excess of the supply of material available. During the year there were prepared the following lantern-slide sets with mimeographed syllabi: Lessons in planning and planting a garden; lessons on dairying; a six weeks' course in farming for women; war camp farms in the United States in 1918; a revision of the home projects in agriculture. There were also available for use in this work sets of slides, with lecture notes, on the farm water supply; flies and their relation to health; the mosquito and its relation to health.

The lantern-slide service has had a wide range, including schools in 32 States and a few schools in Canada. Slides were also loaned

to the Y. M. C. A. camp service for use both in the United States and in France. In Texas and Massachusetts a set of each of the slides was placed in charge of the State departments of agricultural education to be sent out on circuits to the schools teaching agriculture. This service proved very effective and it is hoped will be extended during the coming year. Plans were developed to widen the scope and type of illustrative material, especially to assist the States to obtain duplicates of the material available.

The division continues, as heretofore, to review and abstract for Experiment Station Record the literature on agricultural education, this work requiring a large portion of the time of one member of the staff.

During the year various field trips were made by members of the staff, including visits to State and regional conferences of agricultural directors, supervisors, and teachers; associations at which agricultural instruction was discussed; State colleges giving attention to the training of teachers of agriculture; and schools giving instruction in agriculture. During these trips conferences were held and all assistance possible given to the men in the field.

Relations of the most cordial nature were maintained with the various bureaus of the department and helpful assistance was rendered by these bureaus.

INVESTIGATIONS ON FARMERS' INSTITUTES.

J. M. STEDMAN, *Farmers' Institute Specialist.*

Farmers' institute work in the United States during 1918 as compiled from reports from 31 States included 6,941 institutes, which lasted 7,184 days, comprised 14,446 sessions with an attendance of 1,916,706, employed 2,002 lecturers, and cost \$260,826.09, divided between State appropriations of \$184,463.24 and other funds contributed to the amount of \$76,362.85.

The States Relations Service continued to aid farmers' institute workers, as well as county agents and other extension teachers throughout the country, along the same lines as heretofore. Three new lectures. Renovating the neglected apple orchard, Growing and handling Irish potatoes, and The city and suburban vegetable garden, were published, each accompanied with 50 lantern slides. These lectures were used not only by farmers' institute lecturers but more especially by county agricultural agents, from whom the demand is constantly increasing. They are also used by home-demonstration agents, club leaders, teachers of agriculture in high schools, and extension teachers in agricultural colleges, by grange lecturers, and by other persons who desire aid in presenting their subject before audiences of farmers.

During the year lectures, each accompanied with a set of 50 lantern slides, were loaned to 604 extension workers.

OFFICE OF EXPERIMENT STATIONS.

E. W. ALLEN, *Chief.*

The Office of Experiment Stations continued to exercise its three-fold function of administration, advice, and publication, with

reference to the experiment stations in the States sharing in the Federal appropriations for experimentation and research in agriculture. In discharging this function it not only exercised supervision of the work and expenditures of the stations in order that the intent of the Federal laws might be realized, but it aimed to stimulate and assist the activity intended to be promoted by these laws. This was done as heretofore by maintaining close contact with the stations through annual visits to the stations, correspondence, and the editorial pages of *Experiment Station Record*.

The publication activity of the office was represented by an annual report to Congress on the work and expenditures of the State and insular stations, the issue of *Experiment Station Record*, and the preparation of the card index of American experiment-station literature, which has been in progress for nearly 30 years.

RELATIONS WITH THE STATE AGRICULTURAL EXPERIMENT STATIONS.

The needs arising under war conditions brought the work of the State experiment stations and of this department and other Federal and State agencies into closer and more intimate relationship, giving rise to numerous cooperative endeavors. The stations were called upon for unusual forms of service, which often required interpretation of the Federal acts in relation to such use of the funds. Under the circumstances as liberal an attitude was followed as was felt to be warranted, and in general it was maintained that as far as the Federal funds were concerned the stations should continue to retain their character of institutions for investigation and its interpretation in practice.

The disturbing influences of war conditions had a noticeable effect upon the stations and their work. Aside from the unusual demands upon them for various forms of service, they experienced considerable difficulty in maintaining their staffs, heavily drawn upon for the Army and for other work incident to the war. The reduction in the total of station officers and assistants, even taking into account the replacements, amounted to more than 15 per cent during the period of the war. This unavoidably had an unfavorable effect on the station work, leading in some cases to the abandonment for the time being or modification of lines of study for which suitable workers could not be secured.

New administrative officers entered upon their work during the year at several of the colleges and stations, and in a number of instances the stations were in charge of acting directors during the absence of the station head on war-emergency or reconstruction duties. Such changes, together with changes in the station personnel, called for special attention to the details of administrative management and policy, the proper safeguarding of the organization and the employment of funds, assistance in filling vacancies, and the like.

The register of persons available for agricultural investigation maintained by the office was of special value to the stations in securing men for their various lines of work, and also to returning soldiers trained in scientific agriculture in locating and obtaining positions.

The office, like the stations, returning during the year to a readjustment basis, found many new matters needing attention, among

them the maintenance of the experiment stations in the proper relative position with respect to other branches of the agricultural work. The key position occupied by the stations as originators and interpreters of the information employed in teaching and extension work emphasizes the prime importance of maintaining them on a basis of progressive strength commensurate with the growth of these other branches.

EXPERIMENT STATION RECORD.

In accordance with the general plan in operation for several years, volumes 39 and 40 of the Experiment Station Record, each consisting of nine numbers and the usual author and subject indexes, were prepared during the year. These volumes contain 7,023 abstracts of the world's scientific literature pertaining to agriculture, together with monthly editorials discussing important phases of the developments in agricultural investigation and brief notes on the progress of institutions for agricultural education and research in this country and abroad.

The total number of articles abstracted was practically identical with that for the previous year. Special attention was again given to the selection of material of immediate usefulness under the war and postwar conditions. Likewise many of the editorial articles took up some phase of the effects of the war on research in agriculture and the opportunities and problems confronting research institutions.

INSULAR STATIONS.

The Office of Experiment Stations, as heretofore, had direct charge of the Federal experiment stations in Alaska, Hawaii, Porto Rico, and Guam, administering their work and expenditures through the local agents in charge.

At the beginning of the fiscal year, and for several months thereafter, these stations were busily engaged in problems connected with increasing production and conservation of food. The policy of agricultural diversification, which has been continued since the establishment of the stations, was fully justified by the results obtained. The stations suffered by reason of the departure of many of their men for military service. The manner in which the remaining members of the staffs took up the additional work is worthy of commendation.

The agricultural experiment station on the Island of St. Croix was taken over on January 1, 1919, becoming the experiment station of the Virgin Islands. This station, with an area of about 200 acres, is to be developed as rapidly as possible to cover all lines of agricultural investigation, and the work is to be extended to the other islands of the group.

The administrative heads of the stations remained without change.

The appropriations for the stations for 1919 were: Alaska, \$65,000; Hawaii, \$45,000; Porto Rico, \$45,000; Guam, \$20,000; and Virgin Islands, \$15,000. These sums constitute the resources of the stations, the current sales funds no longer being available for use.

The stations continued to enjoy the cooperation of the various bureaus and divisions of the department, and their work was greatly assisted in this way. Hearty acknowledgment is made for the aid thus received.

The administrative and financial review of the affairs of the stations in connection with the States Relations Service continued, as formerly, under the supervision of Walter H. Evans and the accounting office of the service.

ALASKA STATIONS.

The Alaska stations continued in direct charge of C. C. Georgeson. Stations were maintained at Sitka, Kodiak, Rampart, Fairbanks, and Matanuska. The headquarters is at Sitka.

At Rampart, practically every variety of spring grain sown in 1918 ripened. Of 76 varieties of spring grain that matured, more than half were hybrids that had been produced at the station. Many of these seem to have become fixed in character and they are being propagated for wide distribution throughout the Territory.

At Fairbanks the yields were less than in some years, but barley yielded 30 bushels per acre and oats 48 to 50 bushels per acre when sown on a field scale. An especial effort is being made to increase the stock of some spring wheats for distribution for seed purposes. These grains were received from the experiment station at Tulun, Siberia, and have proved well adapted to Alaskan conditions. About 65 bushels were distributed in 1918 to be grown for seed purposes, and it was estimated that more than 500 acres of wheat would be sown in the Tanana Valley in the spring of 1919. The station at Fairbanks made milling tests of the various grains, and samples of whole wheat flour produced by the station were given a baking test by the Bureau of Chemistry of this department, which showed the flour to be of high grade. The report on the test states: "This flour makes a very good loaf of bread; in fact, it is one of the best whole wheat or graham flour breads we have had occasion to make."

At the Matanuska station, most of the work is still of a pioneer nature, but quite a little was done with various crops during the year. Cereals sown for grain hay matured, and there was a large production of potatoes of good quality. An attempt was made to grow sugar beets in a small way and analyses of roots sent to this department showed an average sugar content of 15.9 per cent. Experiments to determine the possibility of growing sugar beets for seed were undertaken.

At the Kodiak station, the work with sheep and cattle progressed favorably. The herd of cattle was tested for tuberculosis for the fourth time and no new reactors were found. Of the calves dropped by reacting mothers but reared on pasteurized milk, only one out of eleven showed any suspicious symptoms when tested for tuberculosis.

In an effort to eradicate tuberculosis in cattle, cooperative work was carried on with the Territory in testing cattle in all the more accessible localities, the legislature having made an appropriation for that purpose.

The extension work begun as a war emergency project was continued and considerably expanded. Large quantities of seed and plants were distributed and advice was given regarding the crops that could be expected to succeed and the best methods to be pursued in growing them.

A number of farmers' meetings were held in the Matanuska and Tanana valleys during the year, and were well attended. A recent

report shows there have been taken up, under the various homestead laws, 518 claims embracing approximately 103,840 acres.

The plant breeding and horticultural work at Sitka station progressed favorably and large numbers of hybrid strawberries, and other fruits and plants adapted to Alaskan conditions, were distributed.

HAWAII STATION.

This station continued in charge of J. M. Westgate. While the more formal projects were by no means abandoned, and the importance of diversified agriculture continued to be emphasized, the energies of the station were largely devoted during the year to some of the more pressing problems relating to the production and conservation of food for man and forage for animals.

The chemical division paid especial attention to the conservation of Hawaiian fruits and vegetables. A fruit and vegetable drier was constructed that produced a much better product than that obtained by the usual methods and the practicability of drying bananas and various vegetables was demonstrated. The work with starches attracted much attention, and the commercial manufacture of starch from cassava, edible cannas, taro, and other plants, has been undertaken on several of the islands. The starch of the edible canna was found to be easily digested. A satisfactory method was worked out for the manufacture of vinegar containing 4 per cent or more of acetic acid from waste pineapple juice.

The horticultural work was confined largely to studies of the best varieties of tropical fruits for Hawaiian conditions. A survey was made of the coffee industry as to its condition, its necessities, and also the location of possible sources of caffeine in the pulp prunings, etc., that are now wasted.

The agronomy division has demonstrated the superiority of Guam corn over any other variety grown at low elevation in Hawaii. There is local prejudice against white corn and efforts are being made to cross this variety with some good yellow sort. Important results have been secured in sweet potato breeding work and some promising hybrids are under observation.

The plant pathologist has discovered the cause of a very destructive banana disease and has worked out a seemingly satisfactory method of control. This method, which includes sanitation and spraying, was applied to a 75-acre field with promising results. A comprehensive study of root rots of bananas, pineapples, and sugar cane was begun.

The extension division, through its superintendent on Maui, kept in close touch with the agricultural interests of the islands. Demonstrations were made of the curing of pork, caponizing, increased production of corn, pigeon peas, cassava, etc., and of the practicability of producing concentrated feeds to replace grain brought from California. Corn, calf, and pig clubs were established and a beginning made looking toward organizing farm bureaus for the leading agricultural sections of the islands. The work of the various collaborators was continued and many localities are being reached in this way. During the year an extension agent was appointed for the island of Hawaii.

The cooperative work with the Territorial Food Commission was highly successful and the relations were very satisfactory. The work carried on in cooperation with the War Department at Schofield Barracks was continued and considerably extended, and plans were matured for extensive plantings of forage and other crops suited to the locality. The cooperation maintained between the station and the Territory at the Glenwood station on Hawaii was terminated by failure of the legislature to continue the appropriation which had been made for about six years. Provision was made for continuing the work for a time on a collaborator basis.

The Territorial marketing division, established by the station in 1913 and wholly taken over by the Territory in 1917, was intended to provide a means for the disposal of small quantities of produce and thus foster diversified agriculture. The amount of business of the market increased so rapidly that it was selling about \$20,000 worth of island produce a month. Later the retail privilege was withdrawn, and the legislature at its last session did not continue the appropriation for its maintenance.

PORTO RICO STATION.

D. W. May continued as local agent in charge of this station. The work of the station during the year was directed mainly along two lines, investigation and extension. The investigational work was in continuation of projects that have been in progress for some years. The extension work was carried on through demonstrations, meetings, and the distribution of seeds and plants, literature, etc. One of the important lines of investigation was in connection with the mottled leaf disease of sugar cane. This disease has spread rather widely and threatens to curtail sugar production. The station cooperated with the department in making a study of insects as carriers of the disease, the cause of which is as yet unknown. The question of varietal resistance has been given especial attention. Several years ago the station introduced a considerable number of varieties of sugar cane from other tropical countries and among them are several which show more or less resistance to the disease. Efforts are being made to increase seed cane of one of these varieties as rapidly as possible for planting in the infected portions of the island. As a result of the station's investigations on vanilla a number of commercial plantings, ranging from 1 to 10 acres in extent, have been made. Studies were continued on some of the problems relating to the preparation and marketing of the crop.

The rice work, begun a year ago in cooperation with the Office of Cereal Investigations, has yielded promising results. Nursery and other plants have been planted at the station and about 130 acres were sown in field trials carried on by the station and growers in various parts of the island. The results obtained in 1918 were considered so satisfactory that larger plantings were made in 1919.

In furtherance of work in crop rotations and the use of leguminous plants for food, forage, and green manure, soy beans, and other legumes have been introduced and are meeting with much favor.

The station continued to give attention to the development of the fruit industry, especially citrus fruits, pineapples, mangoes, and avocados. Methods have been worked out in cooperation with the

Bureau of Chemistry for the manufacture of fruit juices, thus making a market for otherwise unmarketable fruits.

Experiments in corn improvement were resumed, attention being paid to local varieties that are already acclimated, and the possibility of increasing the yields through care in seed selection has been shown. Similar work with other crops was begun.

In the extension work 1,741 meetings were held during the year and 500 field demonstrations were conducted. Statistical data were collected which show that in 1918 there were planted 413,158 acres to the 10 most important food crops of the island—corn, with 103,577 acres, and beans, with about the same acreage, leading. The main crops, such as sugar cane, tobacco, coffee, and fruits, are not included.

Previous investigations of the station having shown the practicability of cattle tick eradication, the station having been kept free of ticks for some time, an active campaign was begun to eradicate the tick. Ten dipping vats were constructed and about 80 more projected. The outlook for the success of such a campaign seems promising.

GUAM STATION.

The local agent in charge of the Guam station was C. W. Edwards. The island of Guam was visited on July 6, 1918, by a very destructive typhoon accompanied with heavy rain. Much damage was done to the station buildings, fences, and grounds. A number of the station pigs, goats, and chickens were killed, and practically all crops were destroyed. This necessitated beginning anew with many of the projects in agronomy and horticulture. Seeds and plants had to be secured and much of the material was not received until after the most favorable season for planting. A severe drought, extending from February to June, followed, and the effects of the two unusual conditions were reflected in the station work.

In the animal husbandry work some changes were necessary, due to the typhoon. This was especially true in feeding experiments because of the destruction of nearly all native feeds under test. Shortage of feed made it impossible to continue other lines of investigation. An experiment, in which comparison was made between the native practice of tying pigs under shade trees and confining them in properly constructed pens, showed a decided advantage in favor of penning, and many farmers are now providing suitable inclosures for their swine. In the poultry department most of the young breeding stock was lost in the storm of July 6. Work was continued with a Rhode Island Red-native cross. This cross has met with great favor, is hardy, and of good size, and efforts are being made to establish the strain and produce it in quantity for use by the people in grading up their flocks. The breeding work with cattle and goats was continued as in previous years.

The work with corn has been especially valuable. Much of the station crop was saved after the storm. This and all native supplies which were commandeered after the typhoon were used as seed supplies and most of the corn later planted was station-produced seed. The problem of drying and storing the available seed supplies was successfully worked out with the result that the island government is offering at cost insect and moisture-proof tanks modeled upon those at the station. The two grasses, *Paspalum dilatatum* and Para,

were the only forage to survive the typhoon and later drought, and they supplied about the only source of forage. Plantings of cowpeas made immediately after the storm gave very satisfactory results in supplementing and extending the limited grass pasture.

More than 200 pot tests were begun at the station to determine the crop adaptations and fertilizer requirements of certain peculiar Guam soils. The station distributed more seed and plants to farmers during the year than ever before, the distribution including garden seeds, 6,575 packets; plants, 3,028; seed corn, 7,025 pounds; and large quantities of cowpeas and velvet beans.

In March, extension work was definitely begun by W. J. Green, formerly connected with such work in Oklahoma. Three lines of work were inaugurated, farm demonstration for adults, boys' and girls' club work, and school gardens. The island was divided into 15 patrol districts, and the patrolmen, who were chosen from marines having knowledge of farming, cooperated with the extension department. The insular authorities showed a deep interest in this work and aided it in every way. The demonstration work included crops, live stock, and beekeeping. Within three months after the work was started clubs with 499 enrollments had been organized. The school-garden work had been organized for a longer time and at the end of the year 377 boys were engaged in this work. A garden has been established in connection with every school in the island. The extension agent directs the planting and care of the gardens and the superintendent of schools has charge of the disposal of the produce.

VIRGIN ISLANDS STATION.

In the act making appropriations for this department for the fiscal year ending June 30, 1919, provision was made for an experiment station in the recently acquired Virgin Islands. Arrangements were made through the naval governor to take over the experiment station formerly established by the Danish Government on the island of St. Croix, and on January 1, 1919, the station passed under the jurisdiction of this department and became the Agricultural Experiment Station of the Virgin Islands. The former director, Longfield Smith, was continued in charge, and an entomologist was added to the staff. Considerable repair and reconstruction work was done and equipment was secured.

The work of the station at present consists almost entirely of crop investigations, which are continued along the lines which have been established during the past seven years, including especially experiments of various kinds with sugar cane; cotton breeding; corn selection, crossing, and culture; tests of leguminous crops for forage and for green manure (including velvet beans, Lyon beans, cowpeas, Madagascar beans, alfalfa, and others); and replacement of sugar cane by coconut plantations. Experiments are also in progress with citrus and other tropical fruits, sweet potatoes, etc.

The work thus far has been confined to the island of St. Croix, since it embraces most of the readily tillable land. The islands of St. Thomas and St. John are believed to offer opportunities for stock raising, pineapple growing, sisal production, etc., which should be developed as rapidly as possible. St. Thomas is considered to offer favorable opportunities for various horticultural industries which should be investigated and developed.

OFFICE OF EXTENSION WORK IN THE SOUTH.

BRADFORD KNAPP, *Chief.*

The Office of Extension Work in the South has charge of the co-operative extension work of the Department of Agriculture in the 15 Southern States. Its functions, administrative organization, and relationships with the subject-matter bureaus of the department and with the State extension services were not materially changed during the year.

ADMINISTRATIVE FORCE.

During the fiscal year ended June 30, 1919, there were in the Southern States 15 directors of extension; 15 State agents or assistant directors; 79 assistant State and district agents; 1,031 county agents; 93 assistant county agents; 177 negro agents and 105 boys' club agents; 15 State home demonstration agents; 82 assistant State home demonstration agents and district agents; 763 county home demonstration agents; 250 negro women agents; 50 white women city agents, and 7 negro women city agents.

Within the Department of Agriculture the Office of Extension Work in the South was represented by 1 chief, 1 assistant chief, 5 field agents in the administration of the county agent and co-operative extension work in the States; 4 men and 4 women in the administration of the home demonstration work and the boys' and girls' club work, and the necessary office assistants and clerical force. There were also during the year 10 representatives of subject-matter divisions of the department cooperating with the Office of Extension Work in the South in taking technical information from the Department of Agriculture to the States.

FINANCES.

The total amount available for extension work in the Southern States in 1918-19 was \$6,277,576, exclusive of the amount spent for the support of the office at Washington. Of this amount, \$2,205,500 was from the emergency fund and \$4,072,076 was from regular appropriations to the department, the Federal and State Smith-Lever funds, college funds, and the large appropriations made by various counties.

Taking the figures, without the emergency fund, and averaging the 15 Southern States, we find that 8.1 per cent was spent in administration; 2.1 per cent in printing and distribution of publications; 43 per cent for county agents; 24.7 per cent for home demonstration agents, and 4 per cent for boys' club work, while 18.1 per cent was spent for specialists.

The average percentage of all funds, exclusive of the emergency fund, spent for the three principal projects—county agricultural agents, county home demonstration agents, and boys' club work—was 71.7 per cent. If we add the emergency fund to these figures and take the grand total, the percentages expended for the different lines of work are, county agents, 49; home demonstration agents, 28.8; boys' club work, 3.8; specialists, 11.7; publications, 1.4; and administration, 5.3. The percentage given for specialists does not include the amounts expended for specialists from various bureaus of the Department of Agriculture.

The proportionate amounts expended for county agricultural agents and for county home demonstration agents vary in the different States. In some States less than half as much is expended for home demonstration work as for county agent work, while in one State the sums expended for these two purposes are practically equal.

The following table shows the expenditures for the various lines of work classified under general subjects:

Amounts and percentages of funds allotted to various lines of extension work in 1918-19 in the Southern States.

Line of work.	All funds except emergency.		Emergency fund.		Total.	
		Per cent.		Per cent.		Per cent.
Administration.....	\$331,346	8.1			\$331,346	5.3
Publications.....	86,988	2.1			86,988	1.4
County agents.....	1,750,984	43.0	\$1,328,815	60.3	3,079,799	49.0
Home demonstration agents.....	1,007,450	24.7	801,385	36.3	1,808,835	28.8
Boys' clubs.....	161,543	4.0	75,300	3.4	236,843	3.8
Specialists.....	733,765	18.1			733,765	11.7
	4,072,076	100.0	2,205,500	100.0	6,277,576	100.0

COUNTY AGENTS.

ORGANIZATION.

Each county has an organization cooperating with the county agent and the State extension service in the work of improving agricultural conditions. In the majority of the Southern States these organizations consist of community organizations of farmers and their families, the county organization generally consisting of representatives from such community organization. In the most of the Southern States this county organization is known as the county farm council; in some it is known as the county farm bureau. Two-thirds of all the counties in the South have perfected such organizations within the last few years, while the other third all have the foundation laid in community organizations but have not reached the perfection of organization outlined above. These organizations, with the help of the county agents, both men and women, outline the community and county plans of work and participate actively in the carrying out of the programs undertaken. The main feature of the work undertaken through these organizations is the demonstration conducted by the farmer himself (see p. 369).

Besides these demonstrations, meetings are held from time to time and miscellaneous information is given for the purpose of helping individuals to solve difficult problems.

FINANCES.

The money available for the support of the county agent work during the past year was larger than in any year previous. The total amount of funds devoted to the county agent work in the 15 Southern States in 1918-19 was about \$3,080,000, from the following sources:

Smith-Lever fund, Federal and State.....	\$660,000
Emergency fund.....	1,329,000
U. S. Department of Agriculture, direct appropriation.....	375,000
County and other local funds.....	716,000

The average salary paid to the county agent in the Southern States is about \$2,000. Generally he receives a part or all of his traveling expenses in addition to this.

PLAN OF WORK.

In the South the county agent is recognized as the leader in all of the agricultural extension activities in his county. Through him the efforts of all members of the extension service—State and district agents, specialists from the State agricultural college and the United States Department of Agriculture, and club agents—reach the farmer. The activities of the county agent fall into two main lines, work with men and boys' club work. In the South the boys' club work is one of the main activities of each county agent.

In most instances a written plan of work for the year is prepared by the county agent in cooperation with the district agent, specialists, and the advisory committee of the supporting county organization, and subject to the approval of the cooperative extension authorities. This includes a program of demonstrations, both personal and community, with crops and live stock, special campaigns, field meetings, organization work, marketing, organization of boys' clubs, etc.

RESULTS.

The general effect on southern agriculture of a continuous and consistent program of better balanced farming is now evident. The acreage in corn shows a very great increase during the past 10 years in Alabama, Georgia, Mississippi, and South Carolina. The total corn acreage in the Southern States has increased 17.9 per cent since the year 1909 (census), wheat 150 per cent, oats 98.7 per cent, hay 113 per cent, Irish potatoes 64.5 per cent, sweet potatoes 64.6 per cent, rice 32.3 per cent, peanuts about 100 per cent; grain sorghums have increased, from 1915 to 1919, 26.7 per cent in Texas and Oklahoma alone, and velvet beans increased from a small acreage in 1910 to 4,318,000 acres in 1918. The acreage of cotton in 1918, though large, was exceeded three times during the past 10 years.

The live-stock industry in the South has had a similar experience. The growing of more hay, forage crops, and grain, especially corn, soy beans, peanuts, oats, and velvet beans, has greatly increased the production of both hogs and cattle. Dairy cows have increased in the Southern States 10 per cent since 1910. Owing to the protracted drought in western Texas and Oklahoma, the actual number of "other cattle" in the South shows a slight decrease. One-third of all cattle in Texas had to be marketed during 1917 and 1918 to keep them from starving, owing to the most disastrous drought in the history of the western territory. In the sections east of Texas a very large increase is shown.

The campaign for more hogs, with the effective demonstrations put on by the pig-club boys, has greatly advanced the hog industry in the Southern States. Cooperative carload shipments, fostered by the county agents, had a very distinct effect in stimulating this industry. Since 1910 the total number of hogs in the Southern States has increased 31 per cent. Of the 20 highest States in the point of hog production in the United States, 10 are Southern States.

DEMONSTRATIONS.

The corner stone of the county agent work in the South is the actual demonstration conducted by the farmer on his own land with the help of the county agent and specialist. More often than not the demonstration is on a community basis, that is, the farmer conducting the demonstration does so for the purpose of illustrating better practices to himself and to his neighbors. The effect of the demonstration is often very materially increased by the fact that neighbors are copying the practices on their own farms. The total number of acres in crop demonstrations in 1918 was 3,207,848. The total number of farmers demonstrating was 317,509.

The largest acreage in demonstrations with one crop was in corn. More than 70,000 demonstrators cultivated a total of 774,449 acres under special instruction, with an average yield of 35 bushels an acre, more than doubling the average of the whole territory.

There was a great increase in the number of wheat demonstrations. In 1917 there were 19,741, while in 1918 there were 50,310 such demonstrations on a total acreage of 317,948, the average yield being 19.7 bushels per acre.

There was also an increase in rye and peanut demonstrations.

ORCHARDS.—There were nearly four times as many demonstrations in orchards in 1918 as in the year before, there being 19,789 demonstrations with a total number of 705,690 trees. County agents gave advice and counsel regarding pruning, spraying, and otherwise treating 45,716 orchards, involving a total of nearly 5,000,000 trees.

LIVE STOCK.—In 1918 the county agents assisted farmers in bringing in 4,395 head of horses and mules and, with the assistance of specialists, conducted 859 feeding tests, involving 3,821 animals. They helped bring in 12,647 head of pure-bred dairy cattle and 14,997 grades. They helped the specialists in dairying to conduct 1,052 feeding demonstrations, involving 19,200 animals. Outside of the special work in the removal of cattle from the drought-stricken region of Texas and Oklahoma, they assisted in bringing in 17,807 head of purebred beef cattle and 40,183 head of grades. There were 805 feeding demonstrations with beef cattle, with a total of 28,317 head involved. The county agents started 2,195 herds of beef cattle. They assisted farmers in bringing 42,864 head of hogs into the South for breeding purposes, and helped specialists to conduct 7,884 feeding demonstrations, involving 71,901 hogs. The special campaign for increased hog production asked for by the Government was conducted in all States. The allotted percentages of increase were fairly well met, Mississippi and Tennessee leading, each with a 20 per cent increase. The agents helped bring in 10,775 pure-bred sheep and goats, and 69,862 grades, and conducted feeding demonstrations on 367 farms, involving 8,026 animals. In addition, they started 3,526 new herds.

POULTRY WORK.—County agents assisted specialists in conducting poultry demonstrations on 4,623 farms, involving the feeding of 474,397 birds.

LIVE STOCK DISEASES.—To help farmers protect their herds against live stock diseases and pests the county agents induced farmers to se-

cure the treatment of animals for diseases, as follows—2,391,842 head of cattle and 2,299,661 hogs. In this they personally treated 568,167 head of hogs for cholera while administering either the simultaneous or serum treatment, in most instances under authorization of the State live stock sanitary boards. They induced farmers to have 43,396 head of sheep and 43,242 head of horses and mules treated for diseases. The grand total of live stock so protected was 4,778,141 head. In addition to this, they helped procure the building of 2,219 dipping vats and 3,803 silos.

TICK ERADICATION.—The Bureau of Animal Industry, in cooperation with the various State live stock sanitary boards, has been conducting an intensive campaign for cleaning the South of cattle ticks. There were released from quarantine 67,308 square miles of territory during the year. More than half of the original quarantine area is now released. Mississippi was declared tick free and South Carolina expected to be released November 1, 1918. County agents everywhere have assisted the specialists in the necessary educational work and in stocking the country with improved animals after the ticks have been eradicated.

MANURE, FERTILIZERS, AND LIME.—The county agents conducted 63,085 demonstrations in the proper care and saving of manure on farms, estimated to involve over 10,000,000 tons. The county agents assisted farmers and farmers' organizations in the cooperative purchase of lime and in lime demonstrations, involving practically 1,000,000 tons. They gave specific advice to 223,979 farmers regarding the use of fertilizer and conducted 11,665 specific demonstrations. They also induced 2,156 communities or organizations of farmers to purchase fertilizer cooperatively. The value of the fertilizer so purchased by these organizations was \$3,630,195, and the estimated saving due to cooperative purchasing was \$532,106.

GARDENS.—A part of the general work in the Southern States in 1918 was the campaign for home gardens. Other forces were in the field, but the county agents organized this movement in practically every county in 1918, and the success of the movement was due mostly to them. Special agents in charge of the garden work were appointed for the States of Alabama, Georgia, Louisiana, Maryland, North Carolina, Oklahoma, South Carolina, Tennessee, and Virginia. In all of the other Southern States the specialists in horticulture and the county and district agents conducted the campaign. Under war conditions this campaign was definitely aimed at city and town gardens as well as rural gardens. Complete data are not available, but it is estimated that a total of more than 3,000,000 gardens in the South were the result of this campaign.

COOPERATIVE MARKETING AND PURCHASING.—The statement often made that the colleges, the county agents, and the United States Department of Agriculture put all of their emphasis on production and are not assisting the farmers with the difficult problems of marketing may be answered by saying that the county agents have everywhere worked with bodies of farmers organized for the purpose of purchasing farm supplies and marketing farm products. Where the marketing problem has been critical, the county agents have not hesitated to quickly assist farmers and farmers' associations to

organize on the proper basis for making purchases or marketing products. The South is just building its new agriculture, and in this building problem many difficulties regarding the marketing of the new products have arisen and all of the extension forces have realized that it was necessary to help farmers to solve these problems. This the marketing specialists and county agents are doing. The Bureau of Markets of the department has a specialist in marketing, either in direct or very close cooperation with the extension forces of the colleges, in the following States: Virginia, North Carolina, South Carolina, Georgia, Mississippi, Louisiana, Arkansas, Tennessee, and Kentucky.

There have been many reasons for greatly extending marketing efforts, as for example, the increased production of hogs and cattle in the South, the necessity for organizing new systems to take in farm products locally produced and distribute them to local markets, the increased production of food and feed which had to be distributed through local organizations, the drought conditions in western Texas and Oklahoma, and the Government sale of nitrate of soda.

The main items of business of this kind, in which the county agents assisted, were as follows:

Fertilizer, lime, and the like, purchased amounted to 64,382 tons valued at \$1,906,122, exclusive of nitrate of soda; carloads of cattle marketed 751, valued at \$1,031,295; carloads of swine marketed 1,530, valued at \$2,748,918; corn, wheat, and other grain marketed 1,395,960 bushels, valued at \$1,590,448; miscellaneous agricultural products marketed valued at \$2,631,985. The grand total value of the work was \$17,156,232, and the saving \$2,834,067, or about 16 per cent.

HOME DEMONSTRATION WORK AND GIRLS' CLUB WORK.

The home demonstration work was organized for the purpose of giving the same service for women and girls on the farm which the county agent performs for the men and boys. It is organized as a definite part of the State extension service, and represents the cooperative effort of the State agricultural college and the United States Department of Agriculture, and counties and communities. In the majority of the States in the South the home demonstration division of the extension service carries the entire extension work for women and girls. The work is organized on much the same basis in all the States. There is a woman in charge of the work in every State. In Virginia, Tennessee, North Carolina, South Carolina, Georgia, Florida, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas she is practically an assistant director, responsible to the director of extension, and in charge of the home demonstration work for women and girls.

Organization has been moving along rapidly. All extension agents recognize that an organization in the community, representing all the activities, is the ideal organization. The problem of county organization for extension work is discussed under the county agents' work (p. 1484). The home demonstration work has been gradually fitted into the organization. In many counties either a women's section of the county agricultural council has been organized or a women's advisory committee has been established. In all cases the

work is founded on community effort. The home demonstration work is organized on the basis of clubs of women and girls, often, though not always, representing a community organization.

The Southern States had last year 6,391 clubs of rural women, with a regular enrollment of 325,229 and an emergency enrollment of 1,518,746 women; 9,028 girls' clubs, with a regular membership of 146,102 and an emergency enrollment of 759,373; 1,563 clubs for rural negro women, with a membership of 37,913; and 1,822 clubs for negro girls, with a membership of 50,995. There was an emergency enrollment of negro women and girls in these clubs of 247,143, of which about one-third were girls and two-thirds women. In addition to these, there were 1,179 organized communities of city and town women in the urban work, with a regular membership of 119,218, and an urban enrollment among negro women in cities and towns of 224 clubs with a membership of 1,035. In addition to these, there were 2,751 poultry clubs of white women and girls, with a membership of 63,481, and there were 13,434 negro women and girls taking poultry work. This makes a grand total of 23,096 regular clubs of women and girls. The total regular and emergency enrollment was 3,283,669. A little over 2,000,000 of these are women and a little over 1,000,000 are girls. This represents the total number of people enrolled but does not represent the total number of persons reached, as it does not include those in attendance upon lectures, extension meetings, demonstrations, exhibits, etc., who were not enrolled in some club.

Such a large enterprise naturally resulted in many interesting and constructive pieces of organization work. In all of them the home demonstration agent was represented and in most of them she was the leading figure. During the year 1918 in the 15 Southern States there were established 855 community canneries; 639 community demonstration kitchens, where women gathered to receive instruction; 131 community drying centers; 137 rest rooms in cities and towns for the benefit of farm women; 173 egg circles for cooperative sale of poultry and eggs; 211 cooperative breeding associations engaged in the improvement of poultry; and 20 free curb markets were organized where farmers and farm women and girls come to dispose of their products directly to housekeepers.

PURPOSE AND PLAN OF THE WORK.

The whole purpose of the work was to reach, through organization, the largest possible number of women and girls and give them direct assistance in problems of production, conservation, and utilization of food, and in the preservation of health, prevention of disease, introduction of labor-saving devices and home conveniences, beautification of the home and its surroundings, cooperative and individual marketing of products, and thrift and saving from the family income.

This program included gardening, canning, drying, and brining; production of butter and cheese for home use and for market; production and marketing of eggs and poultry; purchase and home manufacture of labor-saving equipment; home management; utilization of home-produced and other foods for a healthful diet; saving

of wheat, meat, sugar, and fats; conservation of clothing; development of community enterprises, such as canneries, drying plants, demonstration kitchens for instruction, and curb markets; and co-operative marketing of products.

In all of this work there were three main objects—first, production; second, economy and thrift; and third, health. Along with the other work considerable attention was given to recreation, social enjoyment in the club meetings, and the general improvement of rural conditions.

RESULTS.

The total number of containers of vegetables and fruits put up during 1918, under the direction of the home demonstration agents, was 64,604,531, valued at \$15,566,456.15. The women enrolled as regular members of clubs, whose work was intensive and thorough, put up 23,528,345 cans, while the regular enrollment of girls put up 10,497,768 cans; 2,654,607 cans are to be credited to the urban work and 19,334,583 to the emergency enrollment. Rural negro women put up 1,073,663 cans and negro girls 430,314 cans; the city negro women 456,470 cans, and the negro emergency enrollment 2,314,776 cans. A very large proportion of the vegetables canned were produced from the home gardens and from the tenth-acre plats of the members of the girls' clubs. Eight hundred and fifty-five community canneries were established for operation on a cooperative basis. A great contribution to the food resources of the South was made during the war as a result of this work of the women and girls.

Besides the millions of home gardens, 91,000 demonstrations of winter and perennial gardens were established and conducted by women and girls to illustrate all-the-year-round food production.

It is difficult to say what proportion of the emergency work should be credited to the girls and what proportion to the women, but it is probable that about one-third of the emergency canning should be credited to the girls. In no other year in the history of the work in the South has so much been done along this line, and the results are to be attributed to the enthusiasm and energy of the agents and to the wonderful organization and devotion of the women and girls who contributed toward these results.

The work in home drying of fruits and vegetables for future use initiated in 1917, owing to the scarcity of cans, advanced very materially during the season of 1918. The total amount of dried fruits and vegetables prepared and stored was 8,932,787 pounds, estimated to be worth \$1,846,625.56. The women established 131 central plants for community drying.

The results in brining and pickling were beyond expectations, about 1,006,222 gallons of vegetables, valued at \$382,808.73 having been preserved and saved. Rural women in the regular enrollment put up 336,872 gallons, and in the emergency enrollment 447,292 gallons. The balance was put up by the girls and a small amount by the negro enrollment.

The agents' reports show that the women enrolled in the work in 1918 produced 16,507,711 pounds of butter and 939,603 pounds of cottage cheese. A considerable proportion of this butter was sold locally and brought an average of 17 cents per pound above the market price for ordinary butter.

During the year 1918 there were organized 173 egg circles and 211 cooperative poultry breeding associations. Through these organizations approximately 1,592,357 chickens were raised and 575,593 dozens of eggs marketed cooperatively and 198,427 dozens individually. The value of the eggs marketed was a little over \$300,000. They marketed 1,148,738 pounds of poultry, valued at \$311,558.82. The agents also report 130,297 dozens of eggs preserved in waterglass.

The home demonstration agents worked in close cooperation with the Food Administration in the conservation of wheat, meat, sugar, and fats, and deserve a fair share of the credit for the success of this campaign.

In addition to these lines of work, household conveniences, labor-saving devices, and equipment of various kinds were placed in thousands of homes, farm women and girls were assisted in the conservation of clothing, and many other things were done to improve the health, beautify the home, and make country life more attractive.

BOYS' AGRICULTURAL CLUBS.

The boys' agricultural club work surpassed all previous records. Stimulated by a spirit of patriotism and assisted by the emergency appropriation, the boys' club enrollment increased from 115,746 in 1917 to 407,540 in 1918, including the emergency members. The grand total production of the clubs, including emergency members and farm makers' clubs for negro boys, was \$12,034,271.27. The average yield of corn grown by club members was 42.8 bushels, while the average for the Southern States was 19.4.

The demonstrative value of club work is being felt throughout the South. Boys' club work has not only gone a long way toward definitely directing and applying the rural boy power of the South into channels of useful work, but their intelligent application of experimental data has in many instances demonstrated to the adult farmer the value of improved methods.

EXTENSION SPECIALISTS.

The agricultural extension work centers around the county agent. It is through him that the great store of information regarding better farm practice is carried from the United States Department of Agriculture and the State agricultural colleges and experiment stations to the large body of farmers scattered through the States. It is also through him that the unsolved problems arising on the farm are brought back to the experiment stations and the department for their solution. It is obviously impossible for the county agent to have a broad enough knowledge of the various sciences necessary to solve, offhand, all of the problems arising in a county with its great variation of crops, live stock, soils, plant diseases, and the like. That the county agent may be able to assist in the solution of these problems, each State maintains a force of specialists whose duty it is to furnish the county agent definite information on matters pertaining to their particular line.

It is very gratifying that as the extension work progresses a better understanding of the relationship between the specialist, the county agent, and other extension workers has developed with it. It is being more clearly recognized that there must be a definite interlock-

ing of the efforts of all members of the extension force if the organization is to function to the greatest advantage. To this end, in practically all cases, the specialist and the county agent are planning their work cooperatively. The specialist maps out, in project form, various kinds of demonstrations designed to meet the problems arising in his particular line. The county agent selects from these projects those particularly applicable to his county. The farmer who conducts the demonstration is selected by the community club or volunteers his effort for his own good and that of his neighbors. The selection is approved by the county agent and the specialist.

Specialists have also rendered effective service by speaking and giving practical demonstrations at meetings, arranging and looking after exhibits at fairs, and assisting in the judging of these exhibits.

NEGRO WORK.

Work with negroes was continued along the same general lines as in previous years with a small increase in the number of agents. As a rule the negro agent is appointed assistant to the white agent so that the regular county agent has general supervision of the work. In counties without negro agents the regular county agent does considerable work with negro farmers so that they receive the benefits of the extension work even though they have no agent working directly with them.

In most of the States, cooperative relations have been perfected between the negro agricultural colleges and the extension division of the college for whites. The negro in charge of the negro agents has his headquarters at the negro agricultural college. The work with negroes has been very effective in stimulating the production of home supplies, especially the home garden. In some States marked progress was made in encouraging negro farmers to keep a cow for supplying milk and butter to their families, and the raising of pigs to supply meat.

OFFICE OF EXTENSION WORK IN THE NORTH AND WEST.

C. B. SMITH, *Chief.*

ADMINISTRATION.

The Office of Extension Work in the North and West has charge of the cooperative extension work of the department in the 33 Northern and Western States. Its administrative duties, organization, and relationships were not materially modified during the year.

Many important administrative questions were handled. In the first few months these problems had to do with the organization and direction of war emergency extension activities, so that not only increased food production but also strict food conservation might be attained. In addition, methods of clothing conservation were given the careful attention they merited. All these activities were conducted in such a way that the permanent improvement of agriculture and home-making conditions, methods, and practices might result. After the signing of the armistice numerous problems arose out of the changed agricultural economic conditions, the return to a peace program of work, and the adjustment necessary because the special

war emergency funds were not to be available after the end of the fiscal year.

Each of the Northern and Western States was visited as usual during the year and the expenditures of the Smith-Lever funds examined, conferences held with the extension director and his staff, and progress and plans of work discussed.

COUNTY AGENT WORK.

This section continued under the immediate charge of W. A. Lloyd. The number of counties employing agents on June 30, 1919, was 1,106, approximately the same as on June 30, 1918. In addition, there were 45 district agents, covering 105 counties, and 104 assistant county agents. The number of county agents reached its maximum about December 1, 1918, at which time there were 1,136 county agents, 52 agents in larger districts covering 156 counties, and 61 assistant county agents. At that time approximately 82 per cent of the agricultural counties in the 33 Northern and Western States were being reached. In a few counties where the work was started in cooperation with county councils of defense the county agents were discontinued shortly after the signing of the armistice because of lack of local funds.

COUNTY AND COMMUNITY ORGANIZATION.

The rapid appointment of agents during 1917 and 1918 made impossible thorough organization in many of the counties. The past year witnessed a great intensification of county and community organization. The development of community programs received special emphasis. The initiative and cooperation of the people of each community were carefully nurtured, and by conferences with community leaders local extension programs were developed. Although the number of county extension organizations did not increase materially from the 775 on June 30, 1918, the membership increased from approximately 300,000 on that date to 409,841 on March 1, 1919. More important, however, was the organization of community committees. No data are available as to the number of such committees on June 30, 1918, but it may be conservatively estimated that more than one-half of the 8,575 community committees existing on June 30, 1919, were organized during the past year. Better understanding was established and maintained with local farmers' organizations, and their machinery was freely lent to the furtherance of the extension program.

DEMONSTRATIONS.

Field demonstrations continued to be the basis of the work. Although during the summer of 1918 definite demonstration work was much interrupted by special or "war work," 77,668 demonstrations were conducted incident to crop and live-stock production. Almost every phase of agriculture where the need of more efficient production was apparent or made evident by a study of local conditions was touched.

The meeting at the demonstration plat is probably the most effective teaching agency. Through it farmers see the effect of the method or practice advocated and determine its application to their

farms. During the year 677,653 people attended such demonstrations conducted by the county agents. The increased profit on demonstration areas alone, due to the better practices, amounted to \$22,206,307, or more than five times the total cost of the work.

WAR WORK OF COUNTY AGENTS.

The county-agent system was expanded as a food production stimulation measure through special funds appropriated by Congress. The county agents thus became the local agencies for propaganda work of this character by both the Nation and the States. A great number of other agencies also sought and secured cooperation.

The following is a partial list of the ways in which the county agents assisted the various departments of the Federal Government and others during the year 1918-19:

The agents secured information as to farm-equipment prices; made surveys to determine farm labor supply, financial condition of farmers owing to crop failure, increase in use of farm machinery, and use of tractors on farms; ascertained the number of farmers in each draft class and the surplus or shortage of labor in each class; assisted in arranging seed loans to farmers in drought-stricken areas in Montana, Kansas, and other States; placed farm help; and promoted campaign for standard width of farm vehicles. For the Bureau of Markets they made a survey to determine the amount of wheat and other cereals thrashed; assisted in securing reports from thrashermen, in wool marketing, and in collecting data regarding the price of wool and hides; made a survey of the retail markets; secured samples of spring wheat and lists of cheese factories; made a survey of the needs of farmers for nitrate of soda and distributed nitrate; collected data regarding the marketing of sweet potatoes and food supplies in homes; collected feed-supply reports; made a lime survey; redistributed sheep and cattle; facilitated wheat marketing; distributed information and gave assistance in connection with the shipping of potatoes; promoted storage of vegetables; and assisted in the movement of cattle from drought-stricken regions of Texas to Northern States. For the Bureau of Plant Industry the agents made surveys to determine the extent and damage of cereal and potato diseases, condition of the clover seed crop, number of farmers raising vetch, distribution of sweet-clover acreage, and acreage of war gardens; located, secured, and distributed seed corn; distributed and introduced new plants and disease-resistant seed; and assisted in control of white pine blister rust and barberry eradication.

The Bureau of Animal Industry was assisted by the agents in the control of animal parasites and hog cholera, in surveys of contagious diseases in cattle, in locating available supplies of alfalfa and clover hay, in the cottage-cheese campaign, in securing a list of sheep feeders, and in moving cattle from drought-stricken areas. The Bureau of Entomology was assisted in surveys to determine damage done by the Hessian fly, bean weevil, codling moth, and by insect pests of cereals, truck crops, and fruits; the presence of nematodes in grain; and the number of farmers keeping bees. The Bureau of Crop Estimates was assisted in securing crop reports, in the determination of winter and spring wheat acreage, in securing lists of

buyers of farm products, and in making surveys of live stock and the pecan crop; the Bureau of Chemistry in carrying on potato flour experiments; the Bureau of Soils in making soil erosion and local price of fertilizer surveys, and in determining the need of farmers for potash; the Forest Service in encouraging the use of national forests for grazing, and in making surveys of land adjacent to national forests to determine the dependence of ranchers on forests; the Biological Survey in campaigns for control and eradication of gophers, jack rabbits, ground squirrels, moles, rats, and other predatory animals; and the Office of Farm Management in attending to many details in connection with the farm-labor survey.

The county agents assisted the War Department in securing castor-bean contracts, labor for construction of camps, and spruce for aircraft production; locating walnut timber; purchasing horses, mules, hay, and straw for the Army; collecting fruit pits for gas masks; considering deferred classification for farmers and soldiers' furloughs; placing conscientious objectors on farms; determining the number of farmers disabled by loss of limbs in operating farms; and securing list of shoe dealers.

They assisted the Treasury Department in miscellaneous activities connected with Liberty loan and war savings stamp campaigns; in the influenza work of the Public Health Service; and in the organization of farm loan associations by the Farm Loan Bureau.

The employment service, the Children's Bureau, and the Labor Reserve of the Department of Labor were assisted by the agents.

For the Council of National Defense county agents made a survey to determine motor transportation routes; cooperated in thrift and conservation campaigns; made report of owners of thrashing outfits; assisted in distributing machinery, establishment of fair prices, and inspection of thrashing and routing of thrashing machines; and secured information regarding wool prices.

The Food Administration was assisted in taking a hog census; in determining prices of foodstuffs, dairy products, and dairy feed; in securing a list of bean growers; in obtaining data regarding milk production; in the food pledge campaigns; in the sale, sampling, and inspecting of beans and stimulating their production; in listing grist mills; in wheat inspection and grading; in food conservation campaigns and use of food substitutes; and in securing lists of stock feed used by farmers.

For the Fuel Administration the agents made surveys of materials used for fuel and secured lists of fuel dealers and public buildings using coal.

The agents cooperated with the agricultural development department of the Railroad Administration.

They made a survey of the price of farm machinery for the Federal Trade Commission.

The agents also assisted the Red Cross in making a survey of nurses and in its relief work and campaigns for funds, and a woman's organization in determining opportunities for work and organization.

CROP PRODUCTION WORK.

Special crop production campaigns were conducted in connection with most of the crops commonly grown, special attention being paid

to stimulating increased acreage and locating and securing good seed. The table below summarizes some of this work.

Some results of the increased food production campaign of county agents.

Crop.	Farmers assisted in securing or locating seed.	Seed secured or located for farmers.	Additional area seeded as result of special campaigns.	Estimated total production on additional acres.
		<i>Bushels.</i>	<i>Acres.</i>	<i>Bushels.</i>
Spring wheat.....	48,854	831,566	1,415,901	21,258,695
Winter wheat.....	28,963	1,119,163	2,724,561	23,902,678
Oats.....	14,142	421,660	182,507	4,893,610
Corn.....	222,123	1,232,099	597,720	12,820,300
Rye.....	11,532	183,595	258,790	1,705,806
Buckwheat.....	2,186	23,601	17,055	331,485
Barley.....	6,333	159,493	122,569	2,827,995
Potatoes.....	9,294	358,779	32,609	2,157,712
Beans.....	4,785	29,578	40,528	247,088
Total.....	348,212	4,359,534	5,392,240	70,145,369

CORN.—The unfortunate seed condition for two preceding years made special emphasis on seed selecting and testing necessary in the fall of 1917 and the spring of 1918. In the fall of 1917 county agents arranged for field selection on 326,662 farms involving sufficient seed for 3,466,986 acres. As the result of campaigns in the spring of 1918, 547,779 farmers tested seed and 10,605,894 acres were planted with tested seed. Reports from agents indicated a stand of corn much above the average in 1918. The seed selecting campaign was renewed in the fall of 1918 and resulted in the field selection of 4,718,691 bushels of seed. The county agents reported a total increased production of nearly 13,000,000 bushels as the result of all campaigns incident to corn.

OATS.—Ninety-seven thousand nine hundred and eighty-three farmers treated seed oats for smut following the agents' directions, and the total acreage seeded with treated seed amounted to nearly 2,000,000 acres. The increased net profit due to seed treatment averaged about \$2 per acre on several thousand demonstration fields where careful records were kept.

HOME AND COMMUNITY GARDENS.—Work in connection with home and community gardens was carried on in both town and country. More than 225,000 families were given direct assistance in connection with home gardens. No estimate is possible of the value of the increased food supply. As a by-product of these campaigns, however, 3,588,070 quarts of fruits and vegetables were canned and 753,389 pounds dried. The agents conducted 6,894 canning demonstrations and furnished information to 149,282 families in regard to storing fruits and vegetables.

LIVE STOCK WORK.

Assistance in sanitation and demonstration of disease control methods continued a prominent phase of the work with live stock. The work was done wherever possible in cooperation with local veterinarians and State and Federal control agencies, the county agent's part being to demonstrate the usefulness and helpfulness of approved

methods. These demonstrations involved the testing of 55,962 animals for tuberculosis, and the vaccination of 380,264 animals for blackleg and 523,189 hogs for cholera.

FARM BUSINESS.

Seventeen thousand eight hundred and thirty-five farmers kept records of their business on blanks furnished by the State farm management demonstrators. The county agents assisted 6,860 of these in closing their accounts. Profitable changes in their farm management were made by 3,444 farmers as a result of records kept.

The county agents assisted in the organization of a large number of cooperative associations for buying farm supplies and selling farm products, and by cooperating with groups of farmers and other agencies in determining the cooperative enterprises needed and obtaining the expert attention necessary to put the enterprises on a sound business basis. The associations are followed up from year to year in an effort to prevent the mistakes which so often cause failure of such enterprises. The total value of cooperative business of farmers' exchanges and cooperative associations organized by county agents in this and preceding years amounted to \$41,877,783. The saving effected amounted to more than \$4,500,000. Three hundred and thirty-two Federal farm loan associations were organized by agents and 19,312 farmers were assisted in securing credit for the purchase of seeds, machinery, fertilizers, and other supplies. The agents helped in meeting the labor situation by the locating of 151,532 men for work on farms.

In carrying forward the various projects and campaigns the agents made more than half a million farm visits, the average number of farm visits per agent being 435.

The spring of 1919 brought serious readjustment problems owing to the prospect of peace brought about by the signing of the armistice. These can only be worked out gradually, though in the main their solution appears to mean a return to normal farm practice with an emphasis on the organization of the farm as a profitably productive business.

EXTENSION WORK WITH WOMEN.

This work continued under the direction of Miss Florence E. Ward. The activities during the year were characterized in every phase by a transition from war-time problems to those of readjustment and peace.

ORGANIZATION.

On June 30, 1918, the home demonstration force in the field numbered 790, including 31 State leaders, 361 agents, and 32 assistant agents in counties, 98 agents in districts, and 107 urban and assistant urban agents. Of this number, about 100 were temporary appointments. On June 30, 1919, workers numbered 582, including 32 State leaders, 329 agents, and 21 assistant agents in counties, 22 district agents, and 98 agents and assistants in cities.

During the war agents were installed without any permanent organization in many counties and districts that provided the required sum for local expenses. Since the war fruitful efforts have been made to establish the agent as an employee of a permanent county organ-

ization in which women have membership and representation on the executive board. In 17 States the work is an integral part of that of the farm bureau; in some others it is conducted as a department of the farm bureau, called home department, women's department, or home bureau. In Illinois and Wisconsin it is organized apart from the farm bureau.

Progress was made in developing county and community programs of work, putting the work on a project basis, and training county and community project leaders. An outstanding feature has been the use of carefully selected and trained volunteer leaders in food production, food preservation, use of war substitutes, clothing, and poultry culling.

In some States, where county funds could formerly be appropriated only for county agent work, legislation has been enacted permitting appropriations for home demonstration work. In many counties the women themselves have secured a considerable increase in local funds necessary to continue the home demonstration work.

Home demonstration work in cities was considered a war measure and no permanent organization was at first attempted. Funds for local expenses were furnished by national, civic, or other organizations, and the agents cooperated with all existing organizations. With the signing of the armistice the development of permanent home bureaus was undertaken in many cases, and on June 30, 1919, there were 20 such bureaus in various stages of development, with more planning to organize in the autumn. Like the farm bureau, the home bureau is based upon a program of work developed by the people of the community, with each project or activity of the program in charge of a community project leader. The home bureaus of Buffalo and Syracuse, N. Y., have paid memberships numbering 930 and 830, respectively.

Besides their emergency service as leaders in food preservation and conservation, urban agents made records along the lines of child feeding, clothing, and thrift work, cooperated in putting on far-reaching milk campaigns, and started canning kitchens, soup kitchens, milk stations, information centers, hot school lunches, and neighborhood centers that have been taken over by municipal authorities or welfare organizations. The most effective work seems to have been done with wives of wage earners, women of foreign extraction, and women employed in industry.

FOOD PRODUCTION, CONSERVATION, AND UTILIZATION.

For the year ended November 30, 1918, the State leaders reported 570 training classes for local leaders in food production and 12,960 in food preservation; 750,000 persons reached by lectures, demonstrations, and home visits; over 1,400 exhibits held; more than 100,000 home gardens planted; more than 100,000 pounds of cottage cheese made in homes; and a marked increase in the efficiency of home poultry flocks, through poultry culling. Food was preserved by those whom agents influenced as follows: 12,532,205 quarts of fruit, 2,572,757 quarts of fruit products, 8,982,461 quarts of vegetables, 269,717 pounds of meat, and 46,380 pounds of fish canned; 344,001 pounds of fruit and 804,565 pounds of vegetables dried; 2,200,000 quarts of vegetables brined; and 462,307 dozens of eggs preserved. Community food enterprises were established with the

advice and assistance of home demonstration agents as follows: 445 canning kitchens, 33 drying establishments, and 93 demonstration kitchens used as instruction centers; 46 cooperative buying associations; 31 cooperative selling associations; 14 curb markets, with sales amounting to \$67,533; and 10 milk stations.

Home demonstration agents gave 27,000 lectures and demonstrations on food selection and the use of war substitutes, and made 37,663 home visits in this connection, reaching over 2,250,000 persons. In addition, they prepared 3,000 exhibits, attended by over 2,700,000 people.

After the armistice, the agents responded to the widespread demand for instruction in food selection, placing special emphasis on child feeding and hot school lunches.

MILK CAMPAIGNS.

Urban home demonstration agents in Michigan, Massachusetts, Connecticut, Rhode Island, and New Jersey, and rural agents in Iowa, Kansas, and Utah took part in vigorous milk campaigns carried on cooperatively with the Dairy Division of the Bureau of Animal Industry, the object being through educational work to stimulate the production and consumption of milk and milk products for human food. This project was timely in view of the records showing progressive malnutrition of children in the United States during the last few years. Records kept by schools showed the effects of an increased use of milk in the diet of undernourished children. Milk talks were given in factories and milk sales increased from 5 to 35 per cent, factory managers permitting distribution of milk at cost to employees during working hours. Stations for the distribution of whole and skimmed milk were also established. The board of health of New Haven, Conn., states that infant mortality decreased 50 per cent in the last year in one factory district in which such a station was established.

IMPROVED HOUSEHOLD EQUIPMENT.

Rapid progress was made in introducing homemade and commercial labor savers, including fireless cookers, pressure cookers, and iceless refrigerators. On December 1, 1918, the State leaders reported 228 water systems and 198 lighting systems installed, 4,281 houses screened, 1,002 kitchens remodeled, and 9,563 pieces of improved equipment installed as a result of the work of the home demonstration agents.

INFLUENZA SERVICE.

During the influenza epidemic, home demonstration agents were called on to assist in important emergency work, such as organizing soup kitchens (49 reported), emergency hospitals, and volunteer nursing services; or to act as hospital cooks and dietitians. Many agents organized classes in home nursing, in connection with State home nursing specialists, local nurses, or doctors, or the Red Cross nursing service.

POULTRY.

In Connecticut, Delaware, Idaho, Illinois, Missouri, and Vermont home demonstration agents played a prominent part in intensive

culling campaigns inaugurated by Federal and State poultry specialists. In one county 250 women culled flocks totaling 23,550 birds, discarding about 40 per cent and saving \$19,000 on feed. Canning of surplus culls and preservation of eggs in waterglass were widely demonstrated. Agents also took up other phases of poultry work.

SPECIALISTS.

A member of the Washington staff delegated to study the work of home economics extension specialists visited 14 States and held conferences with State leaders and specialists and reported upon the work. Fifty home economics extension specialists were employed in 15 States to give instruction and demonstrations in foods and nutrition, clothing, home hygiene and sanitation, household management and conveniences, home decoration, and other subjects. An almost equal number of women who were virtually specialists assisted in such work in the 18 other States.

BOYS' AND GIRLS' CLUB WORK.

The boys' and girls' club work continued in charge of O. H. Benson. Marked progress was made during the year in the employment of paid club leadership. Twenty-eight State, 131 assistant State, 57 district, and 736 county club leaders were employed, in addition to which there were 13,988 volunteer club leaders in charge of local groups. There was a steady tendency toward employment of full-time county club leadership. During the year 31 per cent of the 1,596 counties in the Northern and Western States had paid club leadership, and 21 per cent of all the counties had full-time county club leaders, where the previous year only 16 per cent of the counties had such leaders. The number of full-time county leaders on the rolls on June 20, 1919, was 272.

During 1918 cooperative club leaders conducted 31,336 demonstrations in food preservation and other club projects. At the canning-club demonstrations alone there was an attendance of 372,288. Club leaders visited 204,745 club plats, conducted 1,266 achievement-day programs, held 2,013 leaders' conferences, conducted 4,498 exhibits and 4,532 club fairs and festivals.

A large amount of instructional literature, issued partly by the States and partly by the department, was distributed.

One of the most significant and important steps in boys' and girls' club work during the year was the organization of standard clubs based upon requirements adopted by the club leaders. During 1918, 6,214 standard clubs were organized in 21 States.

During 1918, 527,723 members were enrolled in 21,345 centers, of which 251,032 completed the work, including reports of the season's activities to the State club leaders. The members reporting produced \$6,019,092 worth of products at a cost of \$2,447,313, including payment to the club members of wages for the time expended in the work. Many of the members who did not make their final reports did a considerable amount of work and produced several million dollars' worth of products. The total overhead or supervisory cost was \$547,851, making the supervision cost per member enrolled \$1.05 and per member reporting \$2.18.

The following table gives the number of clubs, the enrollment, the number reporting results, and the results in the more important projects:

Number of clubs organized and total enrollment and results reported in more important projects.

Kind of club.	Clubs organized.	Number enrolled. ¹	Number completing work. ¹	Results reported.
Home-garden.....	6,057	243,406	115,725	2,987,983.76 square rods tended.
Home-canning.....	3,898	78,927	41,823	1,901,789 quarts canned products, 133,067 jars jelly and jam, 40,784 pounds dried products.
Mother-daughter.....	235	5,024	3,498	96,175 quarts canned products, 29,437 jars jelly and jam, 2,125 pounds dried products.
Garment-making.....	2,356	38,239	18,951	198,822 garments made.
Poultry.....	2,171	37,723	16,128	331,072 chicks hatched, 40,735 hens handled, 133,565 dozen eggs.
Pig.....	2,331	31,476	12,974	25,602 pigs managed, 4,423,081 pounds pork.
Potato.....	1,240	23,316	11,307	3,184 acres tended, 646,503 bushels raised.
Bread.....	1,100	18,583	8,706	193,207 loaves baked.
Corn.....	841	13,864	5,723	6,729.02 acres tended, 313,778.78 bushels raised.
Home-economics.....	16	3,987	3,144	
Dairy calf.....	301	4,332	2,552	2,474 calves raised.
Sheep.....	257	3,613	2,341	
Sugar beet.....	98	1,822	1,398	
Rabbit.....	341	3,196	1,249	26,322 rabbits raised.
Bean.....	150	1,861	1,137	
Baby beef.....	162	2,469	985	1,011 beeves managed, 589,123 pounds beef.
Handicraft.....	84	2,131	488	
Miscellaneous.....	207	13,754	2,903	

¹ Includes also boys and girls not members of regularly organized clubs.

FARM MANAGEMENT DEMONSTRATIONS.

The primary object of farm management demonstrations is to teach and to induce farmers to adopt more efficient methods of organizing and administering their farm business. The work is directed in the different States by extension specialists known as farm management demonstrators.

In most of the Northern and Western States the operation of the income tax law has greatly stimulated the keeping of farm accounts. The farm management demonstrators have grasped this opportunity to push farm account keeping as rapidly as possible. In the main the work is being developed by the county agents. In States where the income tax law affects very few farmers the work has made steady growth and has been done with small groups. Many of the field men find that the best method is to work with small community groups. In States where the income tax law affects a greater number of farmers the farm management demonstrators have endeavored to reach the farmers through larger meetings or through the county agents. There is evidence that interest in the work is rapidly increasing and many more farmers are being assisted each year in summarizing their records both by the county agents and by the farm management demonstrators. During the year ended June 30, 1919, farm management demonstrations were conducted in 24 States by 28 demonstrators.

EXTENSION SPECIALISTS.

Extension specialists representing the various bureaus of the department, working in cooperation with this office, continued to study the extension methods practiced in the States and aided in

extending the use of those having special merit. They also carried to the State extension specialists the best results of the research work of the department and endeavored to aid the latter in correlating subject matter and in working out with the county agents a more efficient means of reaching farm people with the desired information and in turn finding out the farm problems which should be brought to the attention of the research bureaus of the department of the State experiment stations.

Specialists of the following bureaus, offices, and divisions of the department cooperated during the year with the extension forces in the States:

The Forest Service made an application of approved forestry principles in the selecting of trees for cutting during the early part of the year while the wood fuel campaign was on and while the War Department was seeking gunstock and airplane timber.

Bureau of Animal Industry specialists encouraged the introduction of sheep into a few central States and on cut-over pine lands of the Upper Lake region, and the reestablishing of the sheep industry in New York and New England. Attention was given to the production of beef cattle by economical methods in the central western States. Organized campaigns for the culling of poultry to increase the egg supply and reduce the feed bills and better methods of feeding were advocated for the increase of both the egg and meat supply. The Dairy Division through its extension specialist continued the cottage cheese production and consumption campaign of the previous year, and increased its efforts in the organizing of cow-testing associations, bull associations, and dairy manufacture. The specialists in charge of animal disease work were engaged particularly in educational methods for the prevention of hog cholera in many of the hog-producing States. These specialists were working in cooperation with the regulatory men and State extension services in assisting county agents in making demonstrations of control methods.

The specialists of the Bureau of Plant Industry continued the campaign to eradicate the common barberry to prevent rust on wheat and entered more vigorously into that against cereal smuts. This work was conducted by squads of demonstrators on seed treatment and barberry identification. One horticultural extension specialist assisted in the preparation of material for boys' and girls' garden clubs and in making a study of extension methods in conducting pomological extension work in the States. A specialist on vegetable gardening assisted in the preparation of material for boys' and girls' clubs and in making plans for the farmer's home garden. Some assistance was given by this person to the commercial growers and canners of tomatoes, peas, and other vegetables.

The Bureau of Biological Survey employed a specialist who conducted work in the Great Plains and the States farther west on the control of rodent pests in cooperation with the county agents and other State forces.

The Bureau of Entomology employed a specialist to conduct its emergency extension work in the control of insect pests and in the production of honey. Very successful campaigns for the control of crickets were carried on in Oregon and Washington and for the control of grasshoppers and chinch bugs in the Middle West and the

Northwest. State extension specialists were cooperated with, as were also the county agents and the regulatory forces of the State, in developing plans for the control of grasshoppers.

The extension specialist in soils visited most of the States in the northern Mississippi Valley and the New England and Rocky Mountain States in the development of a plan of cooperation with the State specialists to increase the nitrogen and humus supply through the raising of more legumes in the crop rotation. He also made plans for extending the saving of manures and the use of green crops and other crop residues. He continued advocating the increased growth of nitrogenous crops to lessen feed bills and to increase the supply and improve the quality of manure.

The specialist representing the Bureau of Markets gave particular attention to the plans under which the marketing organizations of the States were working and to the formation of marketing routes or organizations.

The Office of Farm Management continued its cooperation with this office. The features emphasized in the work of the year were record keeping, the interpreting of the record, cost accounting, increased production per man, and labor distribution.

OFFICE OF HOME ECONOMICS.

C. F. LANGWORTHY, *Chief.*

The Office of Home Economics, developing the general policy followed in the previous year, adapted its work to the special war-time conditions and needs in question of dietetics and the conservation of materials and labor used in the household.

Special emphasis was placed on the work in experimental cookery, partly because during the first months of the year the need for using somewhat unfamiliar food materials required the development and popularization of methods and recipes adapted to such materials and partly because of the increasing demand for the standardization of cooking processes as a means to the better general utilization of food materials, fuel, and kitchen equipment. Much of this work was done in cooperation with or at the request of other bureaus or offices of the department or of other departments, notably the offices of extension work, the Bureau of Chemistry, the Bureau of Plant Industry, the Bureau of Animal Industry, the Bureau of Markets, and the Food Administration. The equipment of the experimental kitchen was increased to include different types of stoves, refrigerators, and other household conveniences so that varying home conditions could be reproduced and comparative studies made of the practical efficiency of different equipment and methods. The nature and results of the work of the experimental kitchen were in brief as follows:

(1) Studies of yeast breads brought out the detrimental effect of long kneading, particularly in the later stages of dough fermentation; several current recipes for yeast starters were tested.

(2) Studies in fuel conservation with gas range determined the losses caused by the common defects of having burners placed too far beneath the cooking utensil, and of having them too large in proportion to the size of the utensil; the claims of a commercial "gas-saver" were not substantiated; gas consumption in using small separate oven over top burner for baking was compared with that of the range oven.

(3) Household methods of making jellies, and of increasing yield from fruits deficient in pectin and in acid by addition of commercial and homemade pectins or of lemon juice or by use of pressure cooker, were studied and favorably reported upon. A study of yield showed that a pound of good jelly-making fruit should yield a pound or more of jelly.

(4) Studies in pastry making emphasized the fact that to be of good quality an economical paste must have water reduced as well as fat, and that vegetable oil can be used for pastry if care is taken not to use too much fat.

(5) Cake making with various oils and other fats demonstrated that baking at temperatures high enough to produce "lumpy cake" (a common fault) causes an increase of gas consumption of about 50 per cent, which is worse than wasted.

(6) A study was made of methods of canning vegetables, especially spinach, and of the rate of heat penetration in processing.

(7) Investigation of various methods of cooking dried fruits and vegetables revealed the fact that in almost all cases preliminary soaking is unnecessary and sometimes distinctly disadvantageous. Observations were also made upon the varying degrees of rapidity with which successfully-dried vegetables gradually lose their color and flavor upon aging, no spoilage having taken place.

(8) Outlines designed to facilitate standardization of methods in experimental cookery were prepared and distributed for use in colleges offering courses in that subject.

(9) Studies in absorption of fat by batters and doughs fried under varying conditions were carried on with a view to controlling this important source of waste.

Experimental studies on the digestibility of various foods were continued. The materials studied included various kinds of wheat flours; wheat bran in a diet containing no wheat flour; water-ground buckwheat; kafir corn milled in specified ways (showing that grinding increases digestibility); soy bean and peanut press cakes (showing them to be nutritious foods as regards composition and digestibility); certain meats concerning the food value of which little reliable information has been available (horse meat, corned seal hams, rabbit, and kid, all of which were assimilated in much the same degree as comparable meats); miscellaneous animal and vegetable fats; and hydrogenated oils.

Various methods were developed for making technical information along the lines of home economics easily available to extension workers and housekeepers, such as a formula by which the food value of a list of foods can be easily and quickly computed and the proper combinations determined; and a series of colored charts showing in attractive pictorial form the groups of foods necessary in an adequate diet and how they may be chosen and combined to make nutritious, palatable, and economical meals. Plans were also worked out for mimeographed loose-leaf notebook information on home economics subjects for the use of home demonstration agents.

In connection with a dietary survey undertaken in cooperation with the Bureau of Markets, 2,000 dietary records, each covering a period of 7 days, were collected from 1,425 families and 575 institutions representing 46 States, 16 nationalities, many occupations and incomes, and both urban and rural conditions.

From a summary of 500 of these family records it appears that the average cost of food per man per day was 46 cents, with an average return in food value of 3,225 calories, 96 grams protein, 118 grams fat, and 405 grams carbohydrate, figures in fairly close accord with the dietary standards ordinarily used in discussing such problems of general nutrition. A comparison of the foodstuffs purchased by the present 500 families with the amounts of these same foods purchased by 400 families about 20 years ago shows that the amount of meat in the diet has decreased about 8 per cent and grain products

about 11 per cent, while dairy products have increased about 6 per cent, vegetables 4 per cent, and fruits 8 per cent. While, judging by these studies, the average diet seems to be adequate, it seems fair to conclude that individual food habits need to be corrected, because out of 500 family studies one-third were getting less than 88 grams of protein and 3,000 calories of energy, values which are considered the minimum for safety.

A different type of survey undertaken, the results of which were tabulated and interpreted during the year, is the so-called household labor survey, made in 91 farm homes in St. Joseph County, Mich. This survey was intended to secure reliable information regarding problems of household management and labor with their important bearings on social and economic conditions, and also to develop methods for similar surveys elsewhere.

Only one-fifth of the farm women represented in this survey hired help at any time, two-thirds depended upon the help given by members of the family, and one-tenth stated that they had no help. The average length of a farm woman's day in this locality was 13 hours in summer and 10 in winter, including time spent at meals. They estimated that they had one and one-half hours of leisure daily in summer and two and one-half in winter. More than one-fourth of the women took no pleasure trips by automobile or train during the year, the others took trips averaging 55 miles. On only 3 farms did the men have the entire care of the poultry, while 69 per cent of the women cared for it all of the year. In 2 of the 3 areas surveyed 73 per cent of the women helped all or a part of the day with farm work during the busy season. Twenty-four out of 27 reporting depended upon the "butter, poultry, and egg money" to furnish the food purchased, household supplies, and part of the family clothing. Only 6 out of the 69 reporting had a bank account, separate from the husband's, for household expenses.

A significant feature of the work with the respiration calorimeter was that done in cooperation with the Bureau of Markets on the specific heat and after-ripening changes of fruit, with special reference to problems of commercial cold storage, in connection with which important improvements were made in the cooling system of the calorimeter. A special respiration apparatus was also devised and constructed for continuation of the cooperative investigations with the Bureau of Entomology on the wintering of bees.

A member of the staff was detailed to assist the Council of National Defense in its food conservation and general thrift work, and 20 so-called United States Thrift Leaflets intended for wide free distribution were prepared to aid the Treasury Department in its educational campaign in wise spending.

Besides bulletins reporting the work of the office, various circulars, popular articles, and mimeographed matter were issued.

The results of the work of the office were brought to the attention of the public not only through publications, but also by correspondence, conferences, and similar ways. This feature of the work has grown to be one of the most effective means of securing and maintaining direct contact with individual housekeepers, teachers, extension workers, and others, the helpfulness of which was especially demonstrated during the war.

REPORT OF THE CHIEF OF THE BUREAU OF PUBLIC
ROADS.

THOS. H. MACDONALD, *Chief of Bureau.*

Roads were planned and their construction supervised for the Marine Corps at Quantico, Va., and for the Bureau of Ordnance at the Edgewood Arsenal, Gunpowder, Md., and outside of cantonments, usually from the cantonment to a city in the vicinity at the following places: Alexandria, Va., to Camp Humphreys; Alexandria, La., to Camp Beauregard; Little Rock, Ark., to Camp Pike; Columbia, S. C., to Camp Jackson; Spartanburg, S. C., to Camp Wadsworth; Greenville, S. C., to Camp Sevier; Petersburg, Va., to Camp Lee; Anniston, Ala., to Camp McClellan.

Several of the above projects were carried out in cooperation between the Federal Government and the State highway departments under the Federal aid road act of 1916.

THE UNITED STATES HIGHWAYS COUNCIL.

The first regular meeting of the United States Highways Council was held in the office of the Director of the Bureau of Public Roads at 10 a. m. Saturday, June 8, 1918.

From the first meeting, June 8, to the last meeting, December 31, 1918, the full council held 27 meetings and the subcommittee 112 meetings. These meetings were in addition to the excellent and continuous service rendered by Mr. Prevost Hubbard and Mr. M. O. Eldridge as a special subcommittee.

Applications for approval, including those which had been submitted to the Office of Public Roads prior to the establishment of the council, reached a total of 7,307. Many of these applications were considered several times by reason of requests for reconsideration or by reason of requirements by the council of further information, so that the total number of considerations aggregated 9,712. No statement as to the exact number of approvals or disapprovals can be given, as many cases were merely deferred and not disapproved, others were conditionally approved or disapproved, others were reconsidered, and still others were affected by an amendment issued September 26 by the War Industries Board to circular 21 permitting the completion to November 1 of projects substantially under way. Still other projects were pending at the time the council ceased its activities, and in consequence it is impossible to segregate those applications which might be considered as definitely disapproved. A quantitative table dealing with the materials, transportation, and funds involved and showing such proportion as had been definitely approved has been prepared, however, and is submitted as follows:

Item.	Unit.	Requested.	Approved.
Capital issues ¹	Dollars.....	49,538,075	7,334,821
Road oil.....	Gallons.....	68,280,401	44,269,826
Tar.....	do.....	56,603,832	53,533,441
Asphalt.....	Tons.....	190,207	153,475
Cement.....	Barrels.....	5,657,350	2,139,769
Brick.....	M.....	109,125	52,239
Steel, structural.....	Pounds.....	10,663,250	694,820
Steel, reinforcing.....	do.....	22,281,275	3,231,301
Crushed stone.....	Tons.....	3,639,819	1,827,705
Gravel.....	do.....	1,204,552	432,707
Sand and screenings.....	do.....	2,216,481	982,479
Slag.....	do.....	520,152	250,428
Corrugated-iron culverts.....	Linear feet.....	107,815	23,704
Piling, timber.....	do.....	164,102	43,588
Pipe, vitrified, drain.....	do.....	2,165,419	99,699
Pipe, cast-iron, drain.....	do.....	47,052	43,740
Lumber.....	Feet b. m.....	5,530,166	1,651,635
Granite blocks.....	Blocks.....	1,420,500	156,500
Miscellaneous.....	Tons.....	123,206	49,513
Cars, open top.....	Cars.....	55,059	26,361
Cars, box.....	do.....	8,543	3,376
Cars, flat.....	do.....	3,705	605

¹ Includes applications acted on by Bureau of Public Roads prior to formal organization of United States Highways Council. Requested \$28,748,034, approved \$3,114,381. The Capital Issues Committee has jurisdiction and the Council served merely as an aid to the committee.

THE FEDERAL AID ROAD ACT.

LEGISLATION.

A careful canvass of all the State highway departments made after the original Federal aid road act of July 11, 1916, had been in effect for more than two years, indicated clearly that there were three limitations which were preventing this law from becoming an effective method of procedure between the Federal Government and the individual States. In its conception this law was founded upon the principle of cooperation for the purpose of stimulating road production and of supporting and aiding the States in their individual efforts, but it was found that practically all of the States were limited in proceeding along the lines of an adequate program: (1) By the post road requirements; (2) by the limitation of Federal participation to \$10,000 per mile; and (3) by the amount of the appropriation carried.

These features of the law were handicapping practically all of the States very seriously. Anyone who is familiar with the rural free-delivery routes as now laid out knows that the mail carrier pursuing his zigzag route does not in many cases follow throughout their length those roads on which traffic is concentrating more and more, and which must therefore receive the first attention from the State road authorities. Improved highways will become one of the greatest possible advantages to the Postal Service, but this will require a rearrangement of routes as the roads are improved. The logical and systematic preparation of the eventual roads suited to rural mail purposes, therefore, requires much flexibility in the law providing Federal aid for road improvement.

The limitation of \$10,000 per mile for Federal participation was reasonable when the law was conceived during 1915 and the early part of 1916, but at the time of the passage of the act the cost of road construction was mounting rapidly, and by the year 1918 the provision under which the Federal Government offered to pay 50 per cent of the cost of the roads and the limitation of \$10,000 per mile could not both be applied in the construction of the higher type roads. The amount of the funds carried by the original appropriation was

thought entirely sufficient to start the Federal aid cooperative program. At the time these sums were fixed, however, it could not be foreseen how enthusiastically the proposal of the Federal Government would be received by the public generally. The States were embarrassed by applications for Federal aid which the original allotments could not supply, and by the appropriation of sums so much greater than the amount necessary to meet the Federal aid appropriation that the whole plan in the fall of 1918 was in a most disappointing status. All of these objections were met in an entirely acceptable manner by the amendments to the original act carried in the Post Office appropriation act of February 28, 1919 (H. R. 13308). The definition of the term "rural post road" was so broadened as to permit the improvement of roads which could not qualify under the original definition. The maximum amount which can be paid by the Federal Government was increased to \$20,000 per mile, exclusive of the cost of bridges of more than 20 feet clear span. The increase in the share of the costs which may be paid by the Federal Government meets fairly well the demands of the several States in that respect. At the suggestion of the Secretary the original appropriation of \$75,000,000 for Federal aid roads available for the five-year period, 1916-1921, was increased by \$200,000,000, of which \$50,000,000 was available at once, \$75,000,000 on July 1, 1919, and \$75,000,000 on July 1, 1920.

NEW REGULATIONS.

The Rules and Regulations for the administration of the Federal aid road act as authorized by section 10 were originally issued by the Secretary on September 1, 1916. While these were drawn after a conference with the State highway officials, in which more or less conflicting views were expressed, it required the light of actual experience to disclose the principal difficulties which existed and which prevented the fullest cooperation with the States. After more than two years' experience a canvass of the States indicated that the principal causes for disagreements or delays in the original Rules and Regulations could be summarized under the following points:

1. Conflicts with the State laws or State constitutions.
2. The limitations as to the expenditure of Federal aid funds for certain costs entering into completed roads.
3. The details of the plans, specifications, and survey requirements.
4. Adherence to standard specifications in specific instances in which economy prompted modifications.
5. Difficulties or delays encountered from inception of projects to final completion, in many cases resulting partially from overcentralization and lack of authority vested in the district engineers or the local representatives of the bureau.

Practically all of the complaints or misunderstandings voiced by the States were subject to classification under one of these causes, and it will be apparent that these difficulties were greatly accentuated by the new and untried State legislation enacted in every State and by the new and enlarged organizations required on the part of the States and the Federal bureau itself.

During the last fiscal year several minor amendments were made. At the December, 1918, meeting of the State highway officials the subject was thoroughly discussed and a general revision of the rules and regulations at once undertaken. These were completed after the amendment to the Federal-aid road act of February, and on March 12, 1919, the rules and regulations were issued. As revised, these

rules and regulations have been generally accepted as satisfactory by the State highway departments.

These rules and regulations, however, must be regarded only as an instrument to facilitate road production under laws in force, whether State or Federal, relating to the Federal-aid road work. Several modifications of present procedure are now in contemplation for the purpose of facilitating and expediting action, and whenever it becomes apparent that revisions can be made which will result in economy of either time or effort, in so far as such modifications are legally possible, recommendations will be made for further revision to the secretary forthwith.

RESPONSE OF STATES TO THE FEDERAL AID ACT.

The Federal aid act inaugurated a plan of road improvement that has met with a remarkable response on the part of the public. Very few of the States were in a position to act until the winter of 1917, because of the need of new legislation and the appropriation of funds to meet the Federal-aid allotments. In April of that year war was declared, with its attendant concentration of effort to the one object. Highway construction throughout the country was necessarily and unavoidably restricted and confined to the more vitally necessary projects during this period. It was not until after the signing of the armistice in November, 1918, that plans were formulated for the resumption of the work which had been brought almost to a stop. But during that period the attitude of the public underwent a great change. The experiences during the war had crystallized public sentiment in favor of an improved system of highways to supplement the transportation facilities afforded by the railroads of the country and to replace the roads which had suffered to such a material extent by the unforeseen traffic which had been forced upon them. The necessity for extensive road improvement was impressed more forcibly upon the public mind by reason of the demonstrated inadequacy of the system of railroad transportation and by the difficulties experienced when, in an endeavor to relieve the railroads, an attempt was made to utilize in a large way the highways in some sections of the country.

That the public is generally supporting a greatly enlarged program of highway construction is evidenced by the fact that up to July 1, 1919, bond issues aggregating \$224,800,000 had been authorized and approved by vote of the people. Provision has also been made in other States for submitting to a vote during the calendar year additional State highway bond issues amounting to more than \$314,000,000. Only one State road bond issue voted on during the year was rejected. In addition to the sums which become available through the sale of bonds, other State road funds have been provided from legislative appropriations, various State road tax levies, and the proceeds of motor vehicle license fees. In addition to these generous State road funds, counties and improvement districts are providing largely through bond issues for very large amounts. From all sources there are in sight funds amounting to considerably over \$1,000,000,000 for highway construction, which will be made available more rapidly than such sums can be expended efficiently and economically. The test of the State highway departments and of the Federal bureau will come in so administering the expenditure of these sums that the con-

fidence of the public will be justified. It is very apparent that the whole highway program has passed beyond the propaganda stage, and that there is now the greatest possible need for the highway organizations to approach the task of actual road building in a responsible, sane spirit that will result in the production of roads rapidly but without extravagance and without loss of faith on the part of the taxpayers.

STATUS OF FEDERAL AID ROAD WORK.

Of the post road appropriations made by the Congress there was available during the fiscal year a total of \$80,000,000, the same being the sum of the appropriations for the fiscal years 1917, 1918, and 1919. From this there was deducted the 3 per cent allowed by law for the administrative purposes and the remainder, or \$77,600,000, was apportioned among the several States. Of this sum there was paid to the States during the fiscal year for road construction work a total of \$2,702,247. At the close of the fiscal year 1918 there had been paid to the States \$125,445. So that the grand total of all payments to the States on June 30, 1919, was \$3,127,693, which left to the credit of the States an unexpended balance of \$74,472,306. In addition, the \$95,000,000 appropriated for the fiscal year 1920 was apportioned to the States, after deducting the 3 per cent for administrative purposes, and that sum became available with the close of the fiscal year. On July 1, 1919, therefore, there was available to the credit of the States for expenditure a total of \$166,622,306.

During the fiscal year this department approved project statements submitted by the States for 736 road projects, involving the improvement of 6,470 miles of road at an estimated cost of \$91,495,797, and on which \$38,664,397 Federal aid was requested. Up to June 30, 1918, 580 project statements had been approved for 6,249.40 miles of road, estimated to cost \$42,278,770, and on which was requested \$16,049,821 Federal aid. So that on June 30, 1919, there had been approved by this department project statements for a total of 1,316 projects, involving 12,719.98 miles of road estimated to cost \$133,774,568, of which \$54,714,219 in Federal aid was requested. At the close of the fiscal year, therefore, there remained to the credit of the States an unallotted balance, including the additional funds which then became available, of \$111,908,087.

Agreements with State highway departments were executed during the fiscal year to cover 453 of the projects for which project statements had been approved. The estimated cost of the projects covered by these agreements amounted to \$41,598,209, of which amount there was set aside in the Treasury \$18,031,680 as Federal aid. At the close of the fiscal year 1918 there had been executed a total of 224 such agreements of an approved estimate of cost of \$14,820,633, of which there was set aside in the Treasury \$5,899,936. Thus, at the close of the fiscal year 1919 a total of 677 agreements to cover projects had been executed, involving a total approved estimate of cost of \$56,418,843, and a total of \$23,931,617 Federal aid. The projects for which agreements had been executed at the close of the fiscal year call for the improvement of a total of 5,791.23 miles of road.

Under the terms of the Federal aid road act the apportionments to the States for each fiscal year remain available for expenditure until the close of the succeeding fiscal year, but it is construed that

funds covered by agreements are expended within the meaning of the law. Each State had a sufficient amount of funds under agreement at the close of the fiscal year to prevent its losing any part of the funds apportioned to it.

Statistical information is shown in the following tables as to the status of Federal aid projects, the miles and types of roads included in Federal aid projects, and the expenditure and construction of roads during the fiscal year:

Summary of miles and types of roads included in Federal aid projects executed during fiscal years 1917, 1918, and 1919.

Type.	Mileage approved.	Per cent of total.	Total cost.
Earth.....	1,622.520	28.02	\$6,615,214.86
Sand-clay.....	626.705	10.83	2,657,970.03
Gravel.....	1,601.744	27.67	10,238,677.92
Macadam.....	163.512	2.82	1,823,550.67
Macadam mat top.....	170.078	2.94	1,275,712.95
Bituminous macadam.....	126.204	2.18	3,103,967.48
Bituminous concrete.....	118.170	2.01	2,821,214.59
Concrete.....	590.325	10.20	18,172,084.19
Brick.....	66.828	1.15	2,845,429.91
Miscellaneous.....	37.791	.65	189,614.53
Undetermined.....	665.992	11.50	6,925,839.97

Federal-aid expenditures and related data for fiscal year 1919.

Date.	Projects under construction.	Federal aid paid during month.	Total Federal aid paid to end of month.	Total number of projects completed to end of month.	Total Federal aid paid on completed projects.	Mileage of completed projects.
To June 30, 1918.....			458,757.60	5	166,274.84	17.643
July, 1918.....	155	114,376.64	573,134.24	6	208,996.38	21.643
August, 1918.....	193	179,303.58	752,437.82	6	208,996.38	21.643
September, 1918.....	243	196,426.51	948,864.33	6	208,996.38	21.643
October, 1918.....	279	253,529.79	1,202,394.12	11	264,690.25	47.677
November, 1918.....	1 269	285,940.24	1,488,334.36	11	264,690.25	47.677
December, 1918.....	281	311,751.08	1,800,085.44	12	284,690.25	51.087
January, 1919.....	300	296,014.59	2,096,100.03	16	461,521.81	61.157
February, 1919.....	312	263,760.91	2,359,860.94	24	566,665.13	79.481
March, 1919.....	312	263,591.62	2,623,452.46	31	702,194.88	116.196
April, 1919.....	341	69,038.88	2,692,491.34	31	702,194.88	116.896
May, 1919.....	420	159,176.37	2,851,667.71	35	784,699.84	148.102
June, 1919.....	566	401,807.81	3,253,475.52	38	828,363.30	184.315

¹ A number of projects closed down for the winter.

Summary of project statements approved and project agreements executed.

Year.	Project statements approved.			Project agreements executed.		
	Number of projects.	Estimated cost.	Federal aid requested.	Number of projects.	Estimated cost.	Federal aid.
Reported for fiscal year 1917....	23	\$1,845,433.60	\$846,151.84	6	\$547,092.25	\$224,717.20
Reported for fiscal year 1918....	557	41,053,200.67	15,478,089.66	218	14,239,939.15	5,658,458.42
Now reported for fiscal year 1919.....	736	91,495,797.99	38,664,397.41	454	41,631,731.67	18,048,441.97

NOTE.—The figures here given for the fiscal years 1917 and 1918 are from the annual reports for those years. As projects are modified from time to time, a project occasionally withdrawn, etc., sums drawn from the figures here given will not agree with the figures shown in the larger table, which figures have, in all cases, been corrected to June 30, 1919.

NATIONAL FOREST ROADS.

During the first half of the fiscal year unfavorable conditions for road improvement, resulting from the war, limited the period during which active operations have been resumed to a few months of the present construction season. The major portion of the work for this fiscal year has been in the last four months. There has been in these few months a marked increase in road activities in the national forests, even though conditions have not returned to the normal pre-war basis.

The year has been marked with a shortage of labor, equipment, and material for construction purposes. Unsettled conditions generally have made contractors extremely cautious, and it has often been difficult to recommend to you awards for work at what was considered satisfactory prices. On a number of occasions we have felt it advisable to recommend against making awards even after work had been extensively advertised and previous proposals rejected. In these instances department forces have been organized to start the work and other portions of the projects have been let out to station contractors. A great handicap to the work has been the lack of suitable equipment in the possession of local contractors who are making proposals on road construction. The assembling at points convenient to our operations of suitable construction equipment which can be loaned to contractors for our work will aid materially in securing more reasonable prices and hasten the completion of our building program.

It is hoped that from the surplus equipment of the War Department allotted to this bureau under the terms of section 7 of the Post Office appropriation act it will be possible to provide for the major equipment needs of this bureau. Requisition has been placed and shipping orders given for approximately \$2,000,000 worth of equipment and material. Very little has been received in time for this season's work. It is important that it be secured in ample time for proper assembling, overhauling, and distribution before the next construction season opens, so that the purchase of other equipment may be obviated.

With respect to explosives the bureau has been materially benefited in having allotted to it about 4,000,000 pounds of T. N. T. from the War and Interior Departments. Considerable of this material has been delivered and some has been used on our work during the present season.

The general organization plan followed during the preceding fiscal year has been continued, there being six distinct offices and suboffices to cooperate with the six western forest districts, the work in the seventh forest district being divided among the district engineers of this bureau in charge of post road work. There has been an increase in the personnel on forest-road work made necessary by our increased building program.

DISTRIBUTION OF SURPLUS WAR EQUIPMENT, SUPPLIES, AND MATERIALS.

As a further stimulus to road-building activities and to facilitate the resumption of such work by the several State highway departments, Congress also incorporated in the Post Office appropriation

act of February 28, 1919, a provision authorizing the Secretary of War to turn over to the Secretary of Agriculture for distribution to the States available war material, equipment, and supplies suitable for use in the improvement of highways and not needed for the purposes of the War Department, to be used on roads constructed in whole or in part by Federal aid, the Secretary of Agriculture being authorized to retain from such distribution not to exceed 10 per cent of such material, equipment, and supplies for use in the construction of national forest roads or other roads constructed under his direct supervision. Such materials were required to be distributed to the States on the same basis as provided by the Federal aid road act for the apportionment of the Federal aid appropriations. Immediately on receipt from the War Department of lists of materials, equipment, and supplies declared to be surplus, a canvass was made to ascertain the requirements of the several States, and allotments were made with a view to meeting these requirements. There had been allotted to the States 20,519 motor trucks and quite a number of miscellaneous articles of equipment suitable for road-building purposes. There was in the hands of the War Department in the United States and in France quite a large amount of additional surplus equipment suitable for use in road-construction work, and the War Department signified that much of this would be turned over to this department.

At the close of the fiscal year about one-third of the number of motor vehicles allotted were actually in possession of the States, and only a very small list of other equipment, supplies, or materials were actually delivered. The total number of motor vehicles and amounts of other equipment and supplies that will eventually be made available for use by the States can not be stated. This distribution of trucks, although not proceeding as rapidly as had been hoped, has assisted many of the States greatly in resuming their road programs. This bureau has acted only as an agent of distribution between the War Department and the various State highway departments, but it is believed that the policy of making available surplus materials and equipment which could be directly used for road-building purposes is one from which the public generally is likely to receive a far greater benefit than if such supplies were disposed of through sales to private concerns. The faith in such a policy has resulted in a vigorous and persistent effort to secure for the States as large an amount of the equipment and supplies as can be put into useful service within a reasonable length of time. This policy has extended to the dispatching of a special representative to France to receive consignments of such material available in France for return to this country.

ROAD BUILDING AND MAINTENANCE INVESTIGATION.

An object-lesson road was built of sand-clay construction in Pierce County, Ga.

Reports on county road systems were made by Butte, Colusa, Santa Cruz, Solano, Sonoma, Sutter, and Yolo Counties, Calif. Advice was given regarding special road problems in Massachusetts, North Carolina, South Carolina, and Virginia. Engineers were furnished to plan and superintend the construction of the Alexandria-Camp Humphreys road in Virginia.

ROAD MANAGEMENT AND ECONOMICS.

The economic highway survey inaugurated toward the end of the fiscal year ended June 30, 1917, has been continued, but on a lesser scale than during the fiscal year 1918. This condition was brought about by the participation of this bureau to a large extent in activities connected with war work, and later to the added stimulus given road construction by the increased appropriations made by Congress for Federal aid work. The office work of completing the final maps of the area surveyed has been in progress during the year. The complete maps and text give detailed information on the roads, bridges, and economic conditions in the territory covered by the surveys. This work has proved of considerable value, as it brings together in a workable manner a vast amount of detailed highway information. The work has not only been of value to the State highway departments and this bureau, but is proving of value to other branches of the Government.

A large amount of data has been compiled relative to the tonnage of the products of the field, forest, and mine for the various counties in the United States. This information finally tabulated will be of considerable value in connection with the future planning of main-line highways, and will also govern to a considerable extent the types of pavement to be constructed on these highways.

ECONOMIC STUDIES OF HIGHWAY SYSTEMS.

The study carried out during the preceding year of the classification of highways and of the procedure followed in their construction and maintenance has been completed, and the final results have been published in serial form in *Public Roads Magazine* under the caption, "State Highway Management, Control, and Procedure." These articles are found in the issues, July, 1918, to February, 1919, inclusive.

FARM IRRIGATION INVESTIGATIONS.

Conclusion of the war terminated the many special investigations which had been made in behalf of the Capital Issues Committee regarding the feasibility and desirability of irrigation and drainage enterprises in course of promotion. Demands for this work were promptly succeeded, however, by calls for advice and technical assistance from many irrigation and drainage districts, organized or prospective, whose plans, held in abeyance during the war, sought immediate execution at its close. Irrigation enterprises of this class, including in all many hundreds of thousands of acres, comprised besides new projects several of long and fairly prosperous history. High values of farm produce gave much encouragement to such enterprises to improve their structure, revise their organizations, and conserve their water supplies, to the end that a more economical distribution of water might be effected and the area served in the past materially extended. Thus, in Idaho alone, projects are now in various stages of promotion which, if carried out as now planned, will increase the irrigated area of the State by 1,500,000 acres; half as much as is now irrigated.

Notwithstanding the rapid development of this work, standard investigations of duty of water, pumping, flow of water in various types of conduits, and efficiency of appliances and equipment used in irrigation, which had either been temporarily discontinued or reduced in scope during the war, were resumed. Technical reports on flow of water in concrete pipes and spillways for reservoirs and canals were completed and await publication. An extensive field examination to determine the efficiency of typical reservoirs in Cache la Poudre Valley, Colo., begun in 1917, was brought to a conclusion. Meanwhile the investigation of flow of water was extended to metal pipes, a survey of effective types of chutes, drops, and other canal structures, begun prior to the war, was resumed, and a final report was prepared on three-years' experiments to determine the proper time and amount of irrigations in the vicinity of Twin Falls, Idaho. Laboratory experiments, which sought to ascertain the movement of moisture from a free-water surface in various soils, were finished and the results assembled in a report which awaits publication. Studies of the capillary movement of moisture between soils of different moisture content were resumed. These investigations are being supplemented by similar studies in irrigated fields, lands provided with artificial drainage, and soils which should be drained.

High cost of iron and steel has greatly widened the field and enlarged the demand for concrete pipe to meet rigid conditions in irrigation systems, notably where pressure pipe is needed for the conveyance of water under high heads. California alone now has more than 150 concrete pipe manufacturers, and concrete pipe is being installed at the rate of many hundred miles a year. A need for the standardization of methods of manufacture and the development of standard tests and testing equipment to determine the strengths of pipes of different makes has resulted in the establishment of a field laboratory where such equipment will be devised and tests conducted. Field tests, meanwhile, have been made to determine the tensile strength, resistance to internal pressure, and perviousness of 40 kinds of concrete pipe now in use in irrigation.

Other work demanded by after-war conditions has included a study of new devices to reduce labor in the distribution and application of water, initiation of experiments to determine the extent of seepage losses from canals, and the extending of first-hand assistance to communities seeking the development of underground water for irrigation. High prices and curtailment of sales of pumping machinery during the war resulted in a material lessening of interest in pumping, but conditions of severe drought and a lifting of war restrictions immediately restored pumping to a position of prime importance in the irrigation field.

DRAINAGE INVESTIGATIONS.

Until the close of the calendar year war conditions continued largely to control the operations of the division. In addition to the fact that approximately 50 per cent of the force was in the military service, the immediate requirements of the situation diverted the attention of agricultural landowners temporarily from contemplated drainage work. Early in 1919, when the improvement of

their land once more claimed their attention, the landowners were at once confronted by the prevailing high costs of labor and materials. Nevertheless a decided tendency has been shown to proceed with important drainage projects in spite of high costs. This tendency has been so marked that by the close of the fiscal year the activities of the drainage division were limited only by the funds available.

Operations, though curtailed, were carried along the same lines as in former years. More attention, however, was given to small projects such as those of farm drainage that would bring quick results, and less to the larger undertakings. Certain technical investigations which had been started in former years and which required continuous records to yield their greatest value were continued.

Cooperative working agreements with the States of Alabama, Arkansas, Georgia, North Carolina, and Tennessee were continued.

During the year 126 separate surveys, in 13 States, were made, and drainage plans prepared for farms where the owner desired either to install tile or construct terraces. In many other cases field examinations were made and advice given informally. The manuscript for a bulletin on farm drainage, to be published by the West Virginia College of Agriculture, was prepared, as was also one for publication by the Alabama Agricultural Experiment Station.

A report on drainage conditions in Michigan was prepared after a full investigation of all aspects of the situation in that State. This report was prepared in cooperation with, and published by, the Michigan Geological and Biological Survey. Studies of the cost of operation of drainage pumping plants in southern Louisiana were continued. The study of the matter of drainage assessments was resumed after having been suspended during the war.

A comprehensive study of the drainage problem presented by the Red River of the North has been undertaken. This work consisted mainly in the correlation of existing data, and has for its ultimate object the correction of the overflow and permanently wet conditions of extensive tracts of land along the river in Minnesota, North Dakota, and South Dakota. Twenty-seven preliminary examinations were made of overflowing streams and swamp areas in various States and reports submitted to landowners.

Studies of underground water and the subsidence of muck soils after draining were made in Florida. Investigations of methods of draining muck and peat soils were carried on in the State of New York.

The records of rainfall and run-off which have been kept continuously since 1910 in the prairie section of Louisiana have been continued. These records are of great value, as they determine the percentage of the rainfall that must be removed, and therefore establish the required capacity of drainage plants. The manuscript was prepared for a bulletin which will summarize the experiments made by this division for determining the roughness coefficient in Kutter's formula. These experiments were made in dredged ditches in Mississippi, Tennessee, Iowa, North Carolina, and Florida. The manuscript for a bulletin giving the results of an extensive study of the flow of water in tile drains has also been completed.

In accordance with an agreement with the Florida Agricultural Experiment Station, cooperative experiments were conducted on the farm of the experiment station at Gainesville, for the purpose of determining the value of sewage irrigation for that type of soil. Experiments were conducted at Vineland, N. J., with several new types of spray nozzles and automatic irrigation sewage valves. Numerous plans for small irrigation plants in the humid section have been prepared and much assistance of an advisory nature rendered.

Twelve investigations and reports were made during the first half of the year, to the Capital Issues Committee, respecting projects for which bond issues were proposed.

RURAL ENGINEERING.

FARM DOMESTIC WATER SUPPLY AND SEWAGE DISPOSAL.

Seven field examinations were made of farm water systems, and advice was given for improving them.

Five rural septic tank installations were designed or the main features outlined.

Work was begun on the preparation of manuscript and illustrations for a bulletin on "Simple Sanitary Conveniences for Farm and Tenant Houses."

Estimate of cost and specifications were prepared for a gravity water system for a large farm establishment in Georgia.

Data was compiled relative to garbage disposal and reduction, plumbing systems, and sewer and pool cleaning machines.

FARM STRUCTURES.

There were prepared for general distribution working drawings, and, in most instances, bills of materials for the following farm structures: A granary, two rural schoolhouses, four farmhouses, three bunk houses, two milk houses, standard cow manger, dairy barn, poultry house, manure pit, roof and storm cellar, movable hog house, self-feeder for hogs, bull barn, breeding rack for cattle, and a small garage.

Plans were prepared for the plumbing and heating layout for the proposed laboratory building at Arlington for the Bureau of Public Roads.

For other bureaus of the department drawings for the following were prepared: Milk station, cheese factory and creamery for the Bureau of Animal Industry, a garage and shed, a greenhouse, and a foreman's residence for the Bureau of Plant Industry at Sacaton, Ariz. This latter was designed particularly to meet conditions prevailing in the arid sections, and it undoubtedly will prove of assistance to ranchers and others in future building operations in Arizona and other arid sections.

An inspection was made of the offices of the Bureau of Crop Estimates, and inspection and advice given relative to the design and construction of a large manure pit at the United States Soldiers' Home. The construction of the Color Investigations Laboratory at Arlington was supervised for the Bureau of Chemistry.

The preparation of the manuscript for a bulletin on the Farm Shop and Equipment was begun.

A number of designs were prepared for use in a bulletin on cattle feeding to be published in cooperation with the Division of Animal Husbandry.

An illustrated yearbook article, "Housing the Worker on the Farm," was prepared and published as a separate.

A number of informal talks were given before demonstration agents in the South on rural housing.

The architect of the division was detailed from August 1, 1918, to April 1, 1919, to the Building Materials Division of the United States War Industries Board to assist in the preparation of standard specifications and details for building construction.

MECHANICAL PROBLEMS.

The dust-spraying apparatus for dusting cotton plants for boll weevil, designed during the previous year, was further developed in cooperation with the Bureau of Entomology.

For the purpose of obtaining data a number of private hydro-electric installations were inspected.

Drawings for several pieces of chemical apparatus were prepared for the Bureau of Chemistry, including an air-cooled gas reaction apparatus, laboratory gas reaction apparatus, metal baths, a phthalic anhydride plant, condensers, automatic valve control.

A yearbook article on "Electricity and power from small streams" was prepared and published as a separate.

Manuscripts and numerous drawings for illustrations for bulletins on "Farm House Heating Plants," "Farm House Lighting," and "Farm Hydro-Electric Plants" were started but the work was not completed.

Farmers' Bulletin No. 991, which is number five of the series "Care and Repair of Farm Implements," was prepared and published.

The chief of the division, assigned to the Secretary's committee on farm equipment control, did considerable work in this connection during the year. Upon the resignation in the spring of 1919 of the official in charge, all of that work was turned over to the Division of Rural Engineering and has been handled without any addition to funds or personnel of the division.

During the season of 1918 the United States Food Administration conducted a campaign looking to the conservation of grain through improved methods of grain thrashing. Upon the termination of the Food Administration's activities the grain saving work was taken over by the Division of Rural Engineering in cooperation with the States Relations Service. In furtherance of the conservation work "thrasher schools" were held in various parts of the grain growing sections of the country. Engineers of the division outlined the courses for and attended these schools, giving talks and demonstrations to farmers and thrasher men on thrasher operating. Though the work was begun late in the spring the results were gratifying as it was shown that more good can be accomplished by instruction prior to the opening of the thrasher season than by an attempt at supervision of operations during thrashing.

MISCELLANEOUS.

In connection with replies to requests for assistance on rural engineering problems there were prepared sketches, data, and short articles on a variety of subjects. In the solution of specific problems there were prepared sketch drawings of alterations and additions to

farmhouses, details of a concrete floor slab, sketch showing how to cut rafters, a four-horse eveners, a concrete seed and potato warehouse, farmhouse heating layouts, farmhouse lighting layouts, a hydropneumatic system for hard and soft water, farmstead layouts.

To the information series used in connection with the correspondence there was added information relating to the following subjects: Fireplace construction, farmstead planning, dairies, plaster and plastering, building materials (manufacturers and dealers).

Problems and correspondence relating to the following subjects have been handled:

Farm structures,
Wall plasters and kalsonines,
Ice house design and construction,
Farm water supply,
Farm sewage disposal,
Farm hydroelectric plants,
Farm lighting systems,
Painting,
Stump pullers,
Farm heating systems,
Windmill electric plants,
Grinding mills,
Thrasher boiler inspection,
Concrete construction,
Cooling systems,

Stream surveys and developments,
Farm ice houses,
Farmstead planning,
Chemical closets,
Farm implements,
Tractors and gas engines,
Protection against lightning,
Fencing,
Stone work,
Insulation,
Damp cellars,
Cement stucco,
Lumber,
Motors, and
Disinfectants.

Exhibits representing the work of the division were prepared for use on county fair circuits; one was also sent to France. Plans for farm structures were sent to France with a view to their use in connection with the reconstruction of the devastated sections of that country and for the instruction of members of the American Expeditionary Forces who are expecting to follow farming when they return to the United States.

TRACTION TESTS.

Calculation of results of traction tests made in the last few years were discontinued in December owing to the induction into military service of the man handling that work.

Under section 9 of "An act making appropriation for the service of the Post Office Department for the fiscal year ending June 30, 1920, and for other purposes," the Secretary of Agriculture is required, through the War Department, to ascertain the number of days any soldier, sailor, or marine has worked on public roads in the several States (other than roads within the limits of cantonments or military reservations in the several States) during the war, the location of the work, and the names and rank of the men so employed. It is further authorized that any officer or enlisted man who has so worked shall have his pay equalized to conform to the compensation paid to civilian employees in the same or like employment, and the amount found to be due shall be paid from the 1920 appropriation allotted in section 8 of the same act to the States wherein the construction or repair work was performed.

As all work done as described in section 9, above referred to, was under the supervision of the War Department, and as the necessary fiscal arrangements require the certification of some supervisory official cognizant with the work, it was found desirable, to expedite the preparation of the necessary pay vouchers, to ask the Secretary of War to detail a representative of that department who should have

cognizance of the work to act as such certifying officer. In response to this request the Secretary of War detailed a representative to act conjointly with a representative assigned from the Bureau of Public Roads of the Department of Agriculture, and the assembling of the required records and claims and the preparation of the necessary vouchers are now in progress.

ROAD MATERIAL TESTS AND RESEARCH.

During the first six months of the last fiscal year research work was continued as during the previous year in a much curtailed form. Inability to obtain men to replace those entering the Army, cooperation with other branches of the Government in war activities, and supervision of specifications and the materials used in Federal-aid road construction account for this lull in investigation work.

Up to November assistance was given the Fuel Administration in its work for the United States Highways Council. This consisted in making recommendations relative to granting permits for securing bituminous materials for road construction and maintenance. In November a plan of research was outlined in order to continue this class of work with renewed vigor, and from November to the end of the fiscal year this phase of laboratory activities has been greatly increased with a corresponding increase in personnel.

ROUTINE CHEMICAL TESTING AND INSPECTION.

Two hundred and sixty-three samples were examined in the chemical laboratory. This represents a decrease of 9 per cent as compared with the preceding fiscal year. Of the samples examined, 206 were bituminous materials, 46 metal, and 11 sand, rock, and Portland cement.

PHYSICAL TESTS OF ROAD BUILDING MATERIAL.

In the physical laboratory, 1,804 samples were tested. This is an increase of 7 per cent as compared with the preceding fiscal year, and is well above the average of routine work. The samples may be classified as follows: Rock, 262; concrete, 252; sand, 205; gravel, 151; slag, 54; cement, 49; miscellaneous, 111. Samples were received from 41 States, and also from Canada.

MICROSCOPIC EXAMINATION AND CLASSIFICATION OF ROAD-BUILDING ROCK.

The Petrographic Laboratory examined 686 samples of road-building material during the year, an increase of almost 9 per cent over the preceding year and well above the average of routine work. Of these samples, 249 were rock, 41 slag, 151 gravel, 189 sand, 45 clay, and 11 miscellaneous.

Of the samples examined in the physical, chemical, and petrographic laboratories, 355 were materials for use in Federal-aid construction.

RESEARCH ON DUST PREVENTIVES AND ROAD BINDERS.

The following investigations have been under way on bituminous materials:

1. Comparison of old and new volatilization tests in gas and electric ovens.
2. Exposure tests on bituminous materials of known chemical composition.
3. Study of the distillation of California and Mexican petroleum with reference to the manufacture of road oils.

4. Bituminous joint fillers.
5. Chemical composition of asphalts and tars.
6. Methods of making float tests.
7. Investigation of the action of copper salts on bituminous materials.
8. Investigation of the toughness of bituminous aggregates.

One investigation on the thickness of bituminous films on different types of aggregates has been completed and the data is ready to be worked up in form for publication. A study of the asphalt content of oils has also been completed and is ready to be put in shape for publication. A paper is now being published on the microscopic examination of bituminous materials. A paper on the Efficiency of Bituminous Surfaces and Bituminous Pavements under Heavy Motor Truck Traffic was presented before the American Road Builders' Association.

EXPERIMENTAL BITUMINOUS ROAD CONSTRUCTION AND MAINTENANCE.

As during the previous year, supervision and inspection of experimental bituminous roads has been confined largely to the vicinity of Washington. One inspection was made, however, of the road between Boston, Mass., and Portland, Me., and between Portland and Bowdoinham, Mass.

NONBITUMINOUS ROAD MATERIAL INVESTIGATIONS.

The quarry investigations begun during the previous year to study industrial practice in the preparation of commercial broken stone aggregates with a view to standardization of sizes and to obtain cost data, etc., was continued and an extensive study was made of the quarries in the South and in eastern Massachusetts and of two quarries near Poughkeepsie, N. Y. Altogether 64 inspections were made of crushed stone producing plants. Papers written as a result of these investigations appeared in the September, 1918, and the June, 1918, issues of Public Roads.

A large number of brick roads were inspected throughout Ohio, Indiana, Illinois, Iowa, Nebraska, and Missouri, in order to make a detailed study of failures in this type of road, and a report on these inspections was published in the February, 1919, issue of Public Roads. A large number of slag-concrete roads were also inspected in the vicinity of Youngstown, Ohio, and a report was prepared on this inspection.

STANDARDIZATION OF METHODS OF TESTING BITUMINOUS ROAD MATERIALS.

Cooperation with the American Society for Testing Materials was continued through the Committee on Bituminous and Nonbituminous Road Materials. The following investigations will be of direct benefit in the standardization work of committee D-4:

- Asphalt content of oils.
- Comparison of volatilization tests.
- Chemical composition of asphalts and tars.
- Methods of making float tests.

STANDARDIZATION OF METHODS OF TESTING NONBITUMINOUS ROAD MATERIALS.

Tests were continued on a revised standard abrasion test of rock and a study is being made of an abrasion test for gravel. Steps were

also taken during the year to study a new abrasion test for concrete. A new abrasion test for stone block is also being standardized and the results are available for the standardization work of the road materials committee of the American Society for Testing Materials.

CONCRETE INVESTIGATIONS.

A large number of tests were made for the concrete-ship department of the United States Shipping Board on the bond strength of steel reinforcing bars coated with protective coatings. Tests were also made of the pressure exerted by concrete against forms when the concrete was poured at different rates. An elaborate series of tests has been planned on an investigation of blast-furnace slag for use in road and bridge construction, and a large number of samples of slag have been collected from all of the principal slag producing plants in the country. A new instrument has been designed and built in the division for measuring the wear of concrete roads under traffic. This instrument will be described in a coming report in Public Roads. Wear measurements were made on the Camp A. A. Humphreys concrete road with this instrument.

The work of testing concrete slabs was temporarily discontinued during the year but will be resumed as soon as possible. A paper based on past tests appeared in the September, 1918, issue of Public Roads. An investigation on the "Bonding of new cement mortar and concrete to old" was completed, and a paper on this subject was published in Public Roads of June, 1919.

ROAD AND BRIDGE FOUNDATION TESTS.

The field tests conducted upon earth fills in the vicinity of Washington were continued, an effort being made to determine accurately the pressures exerted by earth fills against retaining walls. Tests were also continued on the distribution of pressures through earth fills. Specimens have been prepared for conducting impact tests on road slabs. The slabs are laid directly on the subgrade and will be tested under the impact of a machine designed to give the same effect as the rear wheel of a heavy motor truck. A large number of tests have also been made to measure the impact exerted by trucks on roads and a preliminary paper has been prepared. Specimens and apparatus have also been built for a new series of tests on the wear-resisting qualities of paving sections. These sections are laid in narrow strips to a total length of 400 feet and will be subjected to rapid wear by means of a special truck designed to travel continuously back and forth over a narrow portion of the test section. Preliminary tests have also been started on the bearing power of soils with particular reference to the subgrades of roads. A field test was made on the Camp Humphreys concrete road in order to determine the distribution of concentrated loads through the road to the subgrade. A paper on this test appeared in the April issue of Public Roads. The above tests were outlined to throw light upon the theoretical design of higher types of roads.

FEDERAL-AID MATERIALS TESTS.

During the year 2,491 test reports submitted by laboratories throughout the country on samples of material used in Federal-aid

road construction were examined and comments prepared regarding them. In addition, 92 specifications proposed for use in Federal-aid construction were examined and recommendations were made regarding those parts of the specifications dealing with materials.

INSTRUMENT MAKING AND REPAIRING.

Since March 5 the machine shop has been included under the direction of the Division of Tests, and during that period 28 jobs have been completed.

REPORT OF THE CHIEF OF THE BUREAU OF MARKETS.

GEORGE LIVINGSTON, *Acting Chief of Bureau.*

During the fiscal year 1919 the work of the Bureau of Markets was directed by Mr. Charles J. Brand, who resigned June 30, 1919, to accept a commercial position.

The appropriations available were largely augmented by emergency funds, which were deemed to be necessary at the time the appropriation bills were passed in the fall of 1918. The unexpected signing of the armistice changed the aspect of the work materially, however, and it was necessary by the middle of the year to take steps to anticipate the discontinuance of emergency appropriations at the end of June and to prepare to place the Bureau on a normal basis at the beginning of the new fiscal year with as little confusion and detriment to the work as possible. The various market news services of the Bureau had been much expanded with emergency funds and this forced contraction of work made it necessary either to discontinue certain leased-wire circuits during the latter part of the fiscal year or to serve notice that such discontinuance would have to be effected in the summer or fall. Vigorous protests against this action were received, especially from the western part of the country, which was to suffer the greatest loss in service.

These reductions in appropriations caused the elimination of much work which would have an important bearing on present problems in connection with the distribution of food products. Therefore, Congress has recently been requested to provide appropriations for restoring the leased-wire services mentioned and to allow the Bureau to take up certain work which was discontinued, including monthly reports to show the amount of cereals, sugar, and canned goods held in storage, and the city market-reporting service whereby consumers may receive information regarding prices and supplies of fresh foods in important markets.

Between the time of the signing of the armistice and the close of the fiscal year, the Bureau reduced its forces greatly and this process of curtailment has continued steadily through the first months of the present fiscal year. In addition, a large turnover in personnel has taken place. The number of separations in the period indicated exceeded 800, and this added much to the difficulty of performing our work.

As stated in the report for the fiscal year 1918, the regulation of stockyards and live-stock dealers was undertaken by the Department

of Agriculture in response to the proclamation of the President issued on June 18, 1918. The Chief of the Bureau of Markets was designated by the Secretary to administer the supervision of licensees under this proclamation. Supervisors have been stationed in 26 of the most important live-stock markets and in 121 additional stock-yards. In the course of this work it has been possible to recommend and bring about many specific economies and improvements, and the mere fact that the regulations were being enforced caused the voluntary elimination of many irregularities and injurious practices.

The data gathered in the food supply investigations, which have been carried on for the last two years, have been arranged in a series of reports dealing with various phases of the processes of marketing live stock and grain, and several of these reports have been sent to the Federal Trade Commission to be used in connection with their reports on various phases of the food supply situation. The further prosecution of this work should lead to additional valuable results.

The distribution of nitrate of soda, originally undertaken in the 1918 season, was continued during the spring and summer of 1919. On the basis of prevailing retail prices, as reported to the Department, it is estimated that this work saved to the farmers of the country approximately \$2,000,000 during the last year alone. Nearly 153,000 tons of nitrate were distributed this year at the price of \$81 per short ton f. o. b. shipping point.

Butter was added to the commodities upon which the Bureau rendered an inspection service during the past year, though such inspections were instituted on a very modest scale, on account of the lack of funds. This service was conducted in New York, Philadelphia, Chicago, and Minneapolis and will be extended to other important markets when increased appropriations become available.

By Executive order dated December 31, 1918, the work of the domestic wool section of the War Industries Board was transferred to the Bureau of Markets for completion. The accounts received from dealers are being audited, and the excess profits made by them will be collected and distributed to the producers. It is anticipated that this work will be virtually completed during the fiscal year ending June 30, 1920.

On March 4, 1919, the cotton futures act was amended so as to limit the grades deliverable on future contracts to 10; to provide for the classification by the Department of Agriculture of all cotton delivered on future contracts on the exchanges at New York and New Orleans, entered into after March 4, 1919; and to give the Secretary of Agriculture additional authority to conduct investigations as to the purchase and sale of spot cotton in order to secure accurate quotations of the prices of the various grades. This legislation was passed because it was thought that the tenderability of certain low-grade cotton served to depress the value of contracts, because it was considered desirable to avoid the expense and delay involved in the settlement of contracts under the former plan of classification and determination of disputes, because it was believed that these steps would enhance the value of the contract both intrinsically and through increased public confidence, and because the securing and publishing of accurate quotations for spot cotton, particularly of nontenderable grades, was deemed to be of very great importance to producers and the trade.

For the sake of convenience the work of the Bureau is shown in the following detailed report under three classifications: (1) Investigational and demonstrational; (2) service; and (3) regulatory.

INVESTIGATIONAL AND DEMONSTRATIONAL WORK.

FOOD SUPPLY INVESTIGATIONS.

During the year the work of this project, which was supervised by Mr. C. S. Cole, consisted largely of the preparation of reports from the data which were obtained during the previous year and which were discussed fully in the Bureau's annual report for the fiscal year 1918. Some of these reports have been transmitted to the Federal Trade Commission for use in connection with their reports on various phases of the food-supply situation.

One report, based on records of 880 shipments of cattle, hogs, and sheep, deals with questions of transportation, shrinkage, commission charges, and miscellaneous expenses. It compares the costs of such shipments by seasons and by classes of dealers concerned, and is valuable in indicating the most economical methods of marketing live stock.

Records taken from the books of 139 elevators in Illinois and Iowa, covering a period of five years, have been analyzed in another report which deals with general expenses, profits, the seasonal flow of grain, and buying margins between country and terminal markets. This report is practically ready for publication.

The relation of so-called "wirehouses" to future trading and to the cash grain business is discussed in another report which analyzes such establishments to determine their place as a factor in terminal grain marketing and their economic usefulness. A map has been prepared showing the ramifications of the private wires centering in Chicago.

A report on terminal elevators discusses their relation to other factors in the Chicago market. It contains a summary of figures which were taken from the books of several large terminal elevators and which show the results of mixing and conditioning grain, the sources from which grain comes and to whom it is sold. The figures relating to the mixing and conditioning of grain are probably the most authentic and comprehensive ever gathered.

Figures were abstracted from the books of five large line elevators in Minneapolis dealing with 265 country stations that show the grades, weights, and dockage assessed at the country station and at the terminal. These figures cover a period of five years and include 43,000,000 bushels of various grains.

COOPERATIVE PURCHASING AND MARKETING.

This work during the latter part of the fiscal year ended June 30, 1919, was supervised by Mr. O. B. Jesness, succeeding Mr. C. E. Bassett, who resigned in December, 1918.

Personal assistance has been given in the solution of many organization problems; for example, assistance was given to dairy farmers in New England in preparing organization plans, and work of the same character was done with peanut growers in Virginia and North Carolina, bean producers in New York and Colorado, and potato growers in Michigan.

Organization problems were discussed and explained at a number of general gatherings, such as farmers' week and farm bureau meetings. Existing organizations were helped, and information relative to organization questions was supplied to a large number of individuals in this way.

A number of cooperative marketing organizations were visited to obtain information with regard to their form of organization, method of operation and problems encountered, and the general survey of cooperation in the United States, started some years ago, was continued.

State cooperative laws were studied and suggestions in regard to such legislation were given upon request. The suggested cooperative law published in Service and Regulatory Announcements No. 20 (1917) has formed the basis for at least two State laws in force at the present time, and the legislature of a third State has passed a similar law which has just been approved by the governor. Similar legislation has been under consideration in other States during recent sessions of the legislatures.

CITY MARKETING AND DISTRIBUTION.

Concentration of public interest on the high cost of food during the past year has caused a number of municipalities to take under consideration the matter of publicly owned retail markets as a means for obtaining lower prices and more efficient distribution. As a result, the project "City Marketing and Distribution," under the leadership of Mr. G. V. Branch, has been called upon during the fiscal year for surveys, information, and advice in regard to food distribution problems. Work of this nature has been carried on in Cleveland, Akron, and Toledo, Ohio; Jacksonville, Key West, Miami, and St. Augustine, Fla.; Indianapolis, Ind.; Wilkes-Barre, Pa., and Richmond, Va. In the city last named a comprehensive program for the betterment of its public market system was formulated and plans were furnished for the improvement of existing structures and for the installation of refrigeration and cold-storage facilities. The results of this work should be useful in solving comparable problems in other communities. Information and advice also have been given to other municipal governments and to market committees, farmers' organizations, and others.

Studies made in various cities indicate that meats and dairy products may be handled in their public markets at less expense to the dealer than in outside stores. The problem remains, and is receiving earnest attention, to see that the consumers participate in the savings effected by the dealers.

A number of specific market engineering problems received attention during the year and progress was made in perfecting a combined glass-covered refrigerated display and storage counter for meats, especially suited for installation in public retail markets. Studies made during the year added to the information upon which designs and estimates for market layouts, structures, and equipment must be based.

To help cities in establishing farmers' markets considerable attention has been given to the study of existing market ordinances, and an endeavor has been made to prepare a suggestive ordinance which

incorporates necessary and practical provisions for the successful establishment, financing, and operation of such markets.

Investigations were carried on in various types of retail establishments handling farm products because the cost of operation in food-retailing shops is obviously an important factor in the ultimate cost of food to consumers and because the degree of efficiency attained in such operation affects the whole distribution system. Particular attention was given to what may be termed the improved methods of retail distribution, including the so-called "Four-square plan," "Self-service," "Cash and carry," etc.

The marked development of self-service stores in recent years constitutes one of the outstanding features in present-day retail marketing of food. The system is economical of man power and seems to give promise of appreciably lower prices to consumers. Little has been known generally, however, about the actual savings and the principles and methods upon which these stores depend, and the Bureau has received numerous inquiries in regard to these points. Investigations, consequently, were carried on in practically all sections of the United States in which the development of these agencies has been marked.

TRANSPORTATION AND STORAGE.

The transportation work of the Bureau is directed by Mr. G. C. White.

As in previous years, the perfecting of arrangements with common carriers for reports to be used in connection with the Bureau's market news services occupied the major portion of the time and efforts of the workers on this project. Five hundred and ninety-four common carriers made reports to the Bureau, these carriers controlling 248,722 miles, which for practical purposes is the entire mileage of the United States. The term common carrier as used in this connection includes railroads, express companies, and boat lines.

The storage work of the project was interrupted by the detail of the specialist in storage to the War Department in the latter part of October, 1918. Up to that date regulatory measures had been devised, in cooperation with the United States Food Administration, for the control of the cold-storage industry, and plans for the transportation of meats to the fighting front had been worked out in cooperation with the War Department. In order to continue the storage work, an assistant in cold-storage methods and costs was appointed temporarily and spent the remainder of the year, in cooperation with the project "Market Business Practice," in working out a system of uniform accounting for cold-storage plants.

DIRECT MARKETING ACTIVITIES.

The general aim in this work, which was under the supervision of Mr. Lewis B. Flohr, was to ascertain, analyze, and classify the factors that operate for or against the successful marketing of farm produce by parcel post or express from producers direct to consumers; to determine definitely the limitations of direct marketing both from physical and economic standpoints; and to diffuse useful information to interested persons.

During the year experimental shipments to the number of 303, involving 18 commodities and aggregating in weight 6,856½ pounds,

were made by parcel post and express over distances totaling 63,164 miles. The purpose in making these shipments was to obtain first-hand information as to the physical condition of farm produce transported by parcel post and express and to test the efficiency of different kinds of shipping containers. In nearly every instance the success of the shipments depended on the quality of the product, the type of container, care used in packing and transporting, and length of time in transit. The value of a commodity in proportion to its weight and the price which it will bring are factors which must be considered in determining the desirability of marketing by parcel post and express.

Field studies were made in the vicinity of Detroit, Mich., and on the rural parcel post motor routes from Washington, D. C., to McConnellsburg, Pa., to determine the possibilities of the direct marketing of farm products by motor truck, and to ascertain the relative success of efforts that have been made to popularize direct marketing.

In the New England States and in eastern New York work was conducted for the purpose of bringing producers and consumers into business contact. Lists of names and addresses of farmers, with the kinds of products they had for sale, were compiled, and copies of these lists were supplied to consumers in cities. Lists giving consumers' names, addresses, and products wanted were supplied to producers. Similar work was conducted for six months in western New York with Rochester, Corning, and Lockport as consuming centers.

During the year study was completed regarding the marketing of dressed poultry and meats by parcel post, and, in cooperation with the States Relations Service, assistance has been given to extension workers in solving problems relating to the marketing of boys' and girls' club products.

Studies have been made regarding the marketing of home and club canned goods, drug plants, moss, mushrooms, nuts, sirups, and teasel heads.

MOTOR TRANSPORTATION OF FARM PRODUCTS.

This work was started in March, 1918, and was continued up to the close of the fiscal year 1919 under the direction of Mr. J. H. Collins.

Widespread popular interest has for some time been manifested in agricultural districts in the possibilities of obtaining more direct transportation service through more complete utilization of our highways, and this work was designed to assist in the development of this movement along proper lines. Direct cooperation was maintained with owners and operators of existing motor-truck routes.

An accounting system designed to indicate costs of operation and approved forms for shipping records were devised for the use of operators of motor routes. Emphasis was placed on the necessity for the adequate insurance of cargoes, and provisions to be incorporated in cargo insurance policies were suggested after consultation with responsible underwriters. The advantages resulting from the use of proper terminal facilities were pointed out, and the possibilities of establishing central terminal facilities for all routes in certain cities were investigated. Eight demonstration routes were established and operated successfully. Studies also were made of

the operation of farmers' cooperative truck associations, and a preliminary survey of the marketing of live stock by motor truck was conducted in certain live-stock centers. This study, which was completed during the fiscal year, was principally confined to farm areas in New Jersey, Maryland, Pennsylvania, western New York, northern Ohio, and eastern Nebraska. Two bulletins listed at the end of this report were published and give results of this study. These publications have been in wide demand.

MARKET BUSINESS PRACTICE.

The work of this project was somewhat interrupted during the year by the loss of technical men through resignation, enlistment in the military service, or assignment to other war work. On account of this condition, a large portion of the regular work was suspended.

As a result of the past three years' work a manuscript outlining a uniform classification of accounts for creameries has been prepared. This manuscript discusses many of the undesirable business practices employed by creamery managers and points out the procedure which should be followed.

Further investigation of the accounting and business practices of milk-distributing plants has been made, and advice regarding proper procedure and methods has been given to a number of plants. The procedure under the system installed for experimental operation at Grand Rapids, Mich., and at Burlington, Vt., has been carefully observed and perfected.

The operation of a tentative system of accounting for purchasing organizations and cooperative stores has been carefully studied and as a result a manuscript describing the accounting methods and business practices of such organizations has been prepared.

With the promulgation of official grades for grain, it became evident that it would be desirable to revise the methods of accounting which were recommended for grain elevators outlined in Department Bulletin No. 362, and after a great deal of study a manuscript suggesting changes was prepared. In addition to this, the methods employed in marketing grain in the Pacific northwest were studied with a view to devising a system of accounting to meet the peculiar needs of that section.

A tentative system of accounting for cold-storage plants was devised and installed for experimental operation at Boston, Mass., and has been carefully watched during the year. Extensive investigations of the business practices and accounting methods of cold-storage plants have been conducted, and numerous conferences have been held with leaders of the industry.

Investigations of the methods of accounting used by and the business practices of commission houses and handlers of perishable fruits and vegetables were completed, and tentative accounting systems were installed in eight organizations for experimental operation.

As a result of extensive investigation regarding the accounting needs of cotton gin operators, a system of accounting for such agencies has been devised and is now ready for experimental operation.

Methods of demonstrating the work in accounting and business practice have been given careful consideration and it should be possible to obtain very good results by using the bulletins as a basis for

short courses for managers and bookkeepers of marketing organizations. A large number of State schools and colleges have expressed a desire for material of this character upon which to base such courses.

FOREIGN MARKETING INVESTIGATIONS.

The signing of the armistice on November 11, 1918, marked the beginning of unusual activity among producers and exporters in preparation for the resumption of foreign trade, and extensive demands have been made for information concerning foreign marketing conditions. Studies were made regarding the marketing in foreign countries of such American agricultural products as grain, grain products, rice, seeds, cotton, vegetable oils, oil cake, dairy products, live stock, and meats; fresh, dried, and canned fruits and vegetables; and honey, nuts, and leaf tobacco. A large number of official and private foreign publications were reviewed regularly and abstracts and translations were made from them for use in answering correspondence and for publication. The work of this project was directed by Mr. C. W. Moomaw.

Statistics covering exports of agricultural products from the United States by 10-day periods were tabulated during the year, although this work was discontinued in June. Information assembled from steamship manifests at the New York customhouse was used in the publication of daily and weekly reports on the current exports and imports of live stock, meats, dairy products, grain, fruits, and vegetables.

Cooperation was maintained with an interdepartmental committee appointed to classify the export and import statistics published by the Department of Commerce, and for several months work was done in the revision of the classification for agricultural commodities. It is expected that this reclassification will be put into effect January 1, 1920.

To meet the demand for information on foreign markets the publication of a weekly circular entitled "Reports on Foreign Markets for Agricultural Products" was commenced in March, 1919. This publication has been widely circulated and favorably received.

An investigation concerning the fruit markets in Australia and New Zealand was completed in November, 1918, and a report on this subject was prepared for publication. Coincident with this investigation the live stock, meat, wool, and dairying industries of Australasia were studied.

As a result of representations made by an investigator of this Bureau through the American consul general at Auckland, the Government of New Zealand opened its markets to American grapes, which previously had not been allowed entry into that country.

In cooperation with the project "Marketing Live Stock, Meats, and Animal By-Products," an investigator was sent abroad to study the conditions in the live stock, meat, and dairy industries of the United Kingdom and Europe, and to estimate the possible demands upon America during the readjustment period. During the visit of this representative to France the Ministry of Agriculture removed existing restrictions against the importation of American cattle and placed an order in the United States for large numbers of dairy cattle. This Bureau also was instrumental in making an arrange-

ment with the United States Shipping Board whereby these cattle could be shipped to France.

In June, 1919, in cooperation with the project mentioned above, representatives were sent to South America to study the markets for American purebred live stock. In connection with this work attractively illustrated booklets printed in Spanish and Portuguese were issued dealing with the purebred live-stock industry of the United States.

At the request of the relief commission the Bureau of Markets, in February, 1919, sent a grain expert to Europe to assist in estimating the crop and food conditions in the central countries.

In May, 1919, an agricultural trade commissioner was sent to the United Kingdom to study the markets for American agricultural products in that region and to make regular reports by letter and cable on this subject for the information of the American public. Representatives of the same sort should be placed in France, Italy, and Denmark for work in central, southern, and northern Europe, but at present funds will not permit this expansion.

RURAL COOPERATION.

This work was prosecuted under the supervision of Mr. C. W. Thompson during the past fiscal year. The supervision and direction of the investigations concerning rural insurance, rural telephone companies, and rural social and educational activities was, at the end of the year, transferred to the Office of Farm Management in accordance with the plans of the department for an enlargement of the field of that office to include all studies pertaining to farm economics and farm life. The rural credit investigations were discontinued since Congress failed to appropriate funds for the further prosecution of this work.

RURAL CREDIT, INSURANCE, AND COMMUNICATION.

During the fiscal year 1919, a study was made of the farm credit extended by banks, assistance was given the Bureau of the Census in the preparation of the 1920 census schedule, press releases and other material relative to farmers' credit unions in the United States were prepared, and a number of articles on rural credit were published.

A model State law was drawn up for farmers' mutual fire insurance companies, a manuscript for a bulletin on prevailing plans and practices among farmers' mutual fire insurance companies was prepared, a suggested system of records for such companies was completed, assistance was given in the formation of two new State associations of mutual insurance companies, and special attention was given to the study of hail insurance and other special forms of agricultural insurance.

RURAL SOCIAL AND EDUCATIONAL ACTIVITIES.

Information was assembled regarding the more important farmers' organizations for promoting rural social and educational activities, a list of State and local fairs was compiled and brought down to date, the study of rural community buildings was continued, and a bulletin on this subject was prepared for publication.

FOOD SURVEYS.

The food-survey work, conducted under the authority of the food production act and directly supervised by Mr. C. W. Thompson, was brought to a close on June 30, 1919, with the expiration of the emergency appropriation.

Monthly reports of commercial stocks of foodstuffs in the hands of selected classes of business concerns were published throughout the year in a periodical entitled "Food Surveys." These reports covered 22 different commodities and were based upon schedules received from about 20,000 firms each month.

General surveys were made as of July 1, 1918, and January 1, 1919, covering 67 and 68 commodities, respectively. The survey of July 1, 1918, included retail dealers, while that of January 1, 1919, was confined to manufacturers, storage establishments, and wholesale dealers. The data obtained through these surveys were published in considerable detail in special issues of "Food Surveys," with diagrams presenting the most significant facts in graphic form.

Tabulation of the results of the household survey, for which the schedules were assembled in the early part of 1918, was completed and a report was prepared comprising tables, diagrams, and explanatory text, and showing per capita consumption and household stocks per family.

Reports regarding the amount of wheat and other grains thrashed in the United States were secured from thrashermen, in cooperation with the States Relations Service, and the results of this inquiry were supplied to the Bureau of Crop Estimates.

COOPERATION WITH THE STATES IN MARKETING WORK.

The Bureau of Markets cooperated with 22 States in the conduct of marketing work during the fiscal year 1919—namely, Arkansas, Colorado, Connecticut, Georgia, Indiana, Iowa, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Montana, Nebraska, New Mexico, North Carolina, Ohio, Oregon, Tennessee, Texas, Vermont, Virginia, and Washington.

The marketing work in each of these States is under the immediate leadership of a State agent in marketing, whose function it is to assist in coordinating the marketing work done by various agencies in the State concerned. In the majority of the States these agents have assistants engaged on special phases of marketing, four or five men being employed in some cases.

During the fiscal year 1919, Mr. J. C. Skinner represented the Bureau of Markets in the administration and supervision of this work from Washington. In some States general surveys were conducted to obtain information regarding the marketing methods in use and the kinds of assistance most needed. Special investigations regarding the marketing of specific commodities have been conducted from time to time. The State agent in marketing acts as a clearing house for information regarding supply and demand, markets for all sorts of farm produce, and many other matters.

In many States assistance was given in the organization of live-stock shipping and other cooperative associations. By-laws for such associations were prepared and accounting systems installed to insure the businesslike management of such agencies. A great deal of

work was done in the drought areas of the West in locating supplies of hay and feed to be shipped to owners of stock. The United States Railroad Administration assisted in this work by allowing a half freight rate. In the Southern States much work has been done to interest the growers of sweet potatoes in building storage houses to prevent the waste which now occurs in connection with the storage of this crop. Demonstrations of packing and grading fruits, vegetables, and grain have been held and other work has been done to promote better marketing methods.

MARKET GRADES AND STANDARDS FOR FRUITS AND VEGETABLES.

Under this project, which was directed by Messrs. W. M. Scott and C. T. More, the Bureau continued its investigations of the harvesting, grading, packing, and shipping of fruits and vegetables. The scope of the work during the past year, however, was relatively limited because of the loss of experienced men to the military and naval services.

Throughout the country an increasing interest has been shown in uniform grades for fruits and vegetables. The work of the United States Food Administration in enforcing the acceptance of shipments and adjusting claims and the results brought about by the operation of the Food Products Inspection Service did much to demonstrate the necessity of establishing definite standards.

In the principal apple-producing sections of the country information was gathered for use in making specifications for grades of both barreled and boxed apples. As a result of the investigations in the eastern part of the country, a bulletin has been prepared dealing with the preparation of barreled apples for market. Recommendations regarding improved equipment and operating methods for central packing houses in the East have been made. In cooperation with the West Virginia Agricultural College tentative plans were drawn for the erection of a demonstration packing house in the State, and methods for equipping it were recommended. In the Western States a keen interest has been shown in securing uniform State apple grades, and recommendations were recently made at a western conference that uniform grades for boxed apples be established.

Investigations carried on in Georgia and Virginia developed the need of an improved type of peach-sizing machine, and such a machine was built and installed in Georgia. An improved model is now being perfected and the study of peach grading and peach packing houses has been continued.

On January 31, 1918, orders were issued making compulsory upon the part of licensees of the United States Food Administration the use of the potato grades prepared by the Bureau of Markets, which were jointly recommended by the Department of Agriculture and the Food Administration in September, 1917. Following the signing of the armistice these regulations were canceled. A striking improvement in the grading of potatoes resulted from the recommendation and promulgation of these standards, and the best indication of the need for national standard grades is the fact that these grades for potatoes are still voluntarily in as wide use as they were before the regulations making their use compulsory were canceled six months ago. Several States have adopted these grades and made their use compulsory. As a result of continued demonstrational and investiga-

tional work minor changes in these grades were recommended on February 10, 1919, and specifications for a fancy grade have been worked out. This fancy grade will be used largely for the large, smooth, bright potatoes produced in the irrigated sections of the West.

The grades recommended by the Bureau of Markets for domestic Bermuda onions were again used by the Texas State inspectors during the past season. The grading of northern or late onions is now being studied in order that grade specifications may be recommended by the end of the 1919 season.

Investigations of the grading of tomatoes, cabbage, and of some other vegetable crops have progressed to the point where it is believed that grade specifications can be recommended in time for use during the next harvesting season.

Study of the containers used in the marketing of perishables has progressed in a very satisfactory manner during the past fiscal year. Growers, shippers, manufacturers, and the produce trade are showing a greatly increased interest in package standardization.

PRESERVATION OF FRUITS AND VEGETABLES IN TRANSIT AND STORAGE.

During the greater part of the fiscal year 1919 this work was under the supervision of Mr. H. J. Ramsey and after his resignation was directed jointly by Messrs. C. W. Mann and A. W. McKay. Anticipating the fact that the funds for this project would be greatly reduced by the elimination of the emergency appropriation on June 30, 1919, it was necessary to adopt a policy of curtailment during the closing months of the past fiscal year and to dismiss many trained investigators.

Particular attention was given to the methods of handling potatoes in the Delta section of California; cantaloupes in California, Arizona, Colorado, and Indiana; and lettuce, tomatoes, spinach, and onions in the Gulf States and Florida. Demonstrations were made to point out to growers that decay in the transportation of these products is primarily due to faulty methods of handling and refrigerating. Marked reductions in losses resulted from the application of more careful methods of digging and grading potatoes and the maintenance of suitable temperature in refrigerator cars and storage houses and by effecting certain improvements in the handling of lettuce, such as the more complete removal of the lower leaves of each head in harvesting, and shipment in ventilated crates instead of closed hampers. It was found that the decay of strawberries in transit results largely from avoidable injuries inflicted in picking and washing operations and from inefficient refrigeration.

Additional data were secured regarding the effect on the keeping qualities of perishables of various types of refrigerator cars, methods of loading, etc. Vegetables from the South shipped in properly constructed cars cooled 1° an hour faster than those forwarded in cars of the ordinary type and deteriorated less than one-third as much. Experimental shipments to determine the practicability of the use of salt and ice to secure more rapid cooling were continued, and a survey of icing stations was undertaken with a view to suggesting means of reducing present losses of ice.

The fundamental principles underlying the proper design and construction of heater cars for use in the northern sections of the

country, where severe losses occur in shipments during cold weather, were carefully studied in a special testing plant equipped by the Bureau for this purpose at Roseville, Calif. Specifications for heater cars, based on the results of these tests, have been adopted by the Railroad Administration.

Investigations and demonstrations regarding the factors underlying the successful storage of fruits and vegetables were continued. In the Pacific northwest and in Colorado 40 common storage houses for apples and more than 200 potato-storage houses and cellars were built or modified in accordance with plans or suggestions furnished by this Bureau, and the capacity of sweet potato storage houses built in the South directly or partly as a result of this demonstrational work amounts to about 3,000,000 bushels.

The introduction several years ago by the Department of methods of packing California grapes in redwood sawdust resulted in extending the marketing season of such grapes nearly three months and in widening the possible area of distribution. On account of a shortage of redwood, efforts have been made to find a substitute, with the result that spruce, a material hitherto untried, has been found to be very effective. Further demonstration of the practical value of spruce packing will be made next season. The curtailment of this grape-growing industry from the lack of a suitable filler will be avoided should spruce, of which there is a very large supply on the Pacific coast, prove to be as satisfactory a packing material as redwood.

Comprehensive investigations have been conducted to determine the best methods of handling fruits and vegetables which have been injured by freezing in transit, and demonstrations have been made to illustrate practicable methods of salvaging frozen or partly frozen products, attention being called to the possibility of their use both for food and manufacturing purposes. The temperatures at which various products freeze or are injured by excessive chilling have been studied and preliminary investigations have been carried on to determine the factors which affect the keeping quality of fruits and vegetables preserved by freezing storage.

DAILY MAIL REPORTS OF CAR-LOT SHIPMENTS OF FRUITS AND VEGETABLES.

UNLOAD REPORTS.

Daily mail reports of car-lot shipments of all fresh and dried fruits and vegetables have been obtained from common carriers during the past fiscal year. The railroad lines, express companies, and the principal boat lines originating such shipments have cooperated heartily in this work. The scope of these mail reports grew during the year, so that about 110 different commodities are now included, and approximately three-fourths of a million carloads of fresh and dried fruits and vegetables were reported. It was found necessary during the fiscal year to discontinue the publication of the semi-weekly shipment report, which was based on these daily mail reports.

The reports of fruits and vegetables unloaded in 16 of the principal markets have been somewhat diminished in scope during the past year and are now obtained for the following commodities only: Apples, cabbage, cantaloupes, celery, onions, peaches, strawberries, tomatoes, white potatoes. This project is supervised by Mr. W. A. Sherman.

MARKETING DAIRY PRODUCTS.

The work of this project was supervised by Mr. R. C. Potts during the fiscal year 1919.

Surveys of milk-marketing conditions, including the sources and amount of available supplies, the demand for and methods of distributing fluid milk and cream, were made at Sedalia and Kansas City, Mo.; Leavenworth and Kansas City, Kans.; and Cumberland, Md. Reports on these surveys were prepared and recommendations were made for the improvement of marketing methods and conditions in the cities named.

Special attention was given to problems connected with the business management and operation of city milk-distributing plants, especially those owned and operated by farmers' cooperative companies.

Field campaigns to increase the demand for and distribution of cottage cheese were conducted in New York, Massachusetts, and Connecticut with most satisfactory results.

Special investigations were made of the production, consumption, and prices of casein in the United States to determine the possibility of furnishing adequate supplies for war needs by domestic production. The results of the investigations were made available to the Aircraft Construction Division of the Navy Department and to the War Trade Board.

The size of existing stocks and the prices of milk powder were investigated for the purpose of obtaining definite information regarding market conditions which were reported to be injurious to the development of the milk powder industry. Investigations proved, however, that the alleged conditions did not exist.

Studies of the sources of supply, production, demand, prices, and market conditions of butter and cheese were made. It is hoped that complete statistics on this subject may be published for the years 1917 and 1918.

MARKETING LIVE STOCK, MEATS, AND ANIMAL BY-PRODUCTS.

This project is under the supervision of Mr. Louis D. Hall and furnishes the fundamental information upon which the market news service and the regulatory work connected with live stock and meats are based. The information obtained by this project served as a guide in preparing the regulations governing licensees operating stockyards or dealing in live or dead stock at stockyards and was useful in planning and directing the stockyards' supervision service.

A survey of the marketing of purebred live stock in the United States was begun early in the fiscal year in order that the Bureau might be prepared to render assistance in reestablishing the live-stock industry in the devastated countries of Europe. As a result of this survey, information was made available showing the location by counties of the majority of breeders engaged in the production of each of the principal breeds of live stock. This information is being used to aid buyers and sellers in both domestic and foreign trade.

The detailed study of the problem of marketing soft pork which was begun during the latter part of the last fiscal year was continued in order to determine a basis for the difference in prices which should be paid for live hogs classed as "soft" or "oily" and those classed

as "firm." The results of this study now are being prepared for publication.

An investigation was made in cooperation with the Bureau of Animal Industry and the Bureau of Chemistry to determine the reasons for numerous complaints regarding the country hide situation, especially with reference to the physical condition of country hides and skins and the apparent discrimination in the prices for these products, both at the farm and on the market, and to ascertain what improvements could be effected. As a result of this work a bulletin was prepared and educational posters bearing general instructions regarding proper methods of skinning, curing, and marketing hides were printed for distribution.

A preliminary, country-wide study has been made to obtain definite facts relating to the various types of retail meat stores and more complete information relative to the costs of distributing meats at retail.

Careful studies were made of the present commercial grades for wool, and a collection of samples was made preparatory to the development of tentative standards for various grades of wool. Circulars were prepared and distributed suggesting better methods of preparing and marketing wool, and direct marketing was encouraged where possible by putting wool producers into possession of information regarding direct channels for marketing their clips. During the war active cooperation was maintained in connection with this work with the War and Navy Departments, the Council of National Defense, War Trade Board, War Industries Board, Shipping Board, and Tariff Commission.

GRAIN MARKETING INVESTIGATIONS.

Emergency activities of pressing nature made it necessary to restrict in a measure this investigational work. Mr. C. S. Cole supervised the project during the past fiscal year.

Studies of the methods of marketing grain sorghums, the kind marketed, and the demand for and uses of such grains were carried on in the principal producing and consuming sections. These investigations show that milo and kafir are the principal grains used to feed all classes of live stock in producing sections, and also are used in practically all mixed poultry feeds in the leading poultry sections of the United States. These grains also are used in the manufacture of starch and alcohol and for human food.

Investigations of a preliminary character have been carried on with regard to the marketing of broom corn. Information has been obtained from local freight agents regarding the amount of standard and dwarf varieties shipped from stations in important producing territories, and the uses and distribution of broom corn have been studied as a basis for more specialized future investigations.

SEED MARKETING INVESTIGATIONS.

During the first half of the fiscal year ending June 30, 1919, investigations were made to determine the effects of the war on commercial seed production, seed imports and exports, domestic demand, size of stocks carried, prices, etc.

A study has been made of seed marketing on the farm and much information has been obtained. Among other things, these data include, in percentages for the various classes of seed, the sources of the farmers' seed supply in every State and show how he prepares and disposes of his seeds.

Some of the leading seed markets in Europe were visited in order to make recommendations for increasing and stabilizing, if possible, the seed trade between the United States and European countries.

Production and consumption maps for clovers, grasses, millets, sorghos, cowpeas, Canada field peas, and soy beans were prepared in order to show the counties normally having a surplus, sufficiency, or deficiency of each of the kinds of seeds.

These investigations were supervised by Mr. W. A. Wheeler.

GRAIN STANDARDIZATION AND GRAIN HANDLING AND TRANSPORTATION.

During the last fiscal year investigations were made of factors to be considered in formulating standard grades of oats, barley, rice, and flaxseed. This and other related work, as well as certain investigations regarding grain handling and transportation, were supervised by Mr. S. A. Regan.

As a result of the investigations concerning oats, official standards for this grain were promulgated under date of March 14, 1919, to become effective June 16, 1919. Before promulgating the standards a series of hearings were held throughout the United States to obtain the opinion of the grain trade as to their workability.

Specifications for tentative or permissive standards for milled rice were prepared and announced in Markets Document No. 15, issued September, 1918. A supplemental publication relating to standards and entitled "Instructions for the Sampling, Handling, Analyzing, and Grading of Samples of Milled Rice" was published as Markets Document No. 16, in October, 1918. These standards were adopted by the United States Food Administration and used by its rice committee in grading all rice purchased by the Government for the Army, Navy, Belgian relief, and the allied nations. The several rice-grading offices of the United States Food Administration were visited from time to time and instructions in grading were given so that the tentative standards might be correctly interpreted.

Much work has been done to determine the practicability of cleaning grain by means of special attachments on thrashing machines. These investigations have resulted in the development of a special pneumatic cleaner to be attached to the thrashing machine, which is proving effective.

Careful investigations have been made to determine the effect of storing wheat and barley in concrete and steel bins. These studies were conducted in cooperation with the Food Administration Grain Corporation. Manitoba wheat, containing approximately 15 per cent of moisture, was placed in large steel tanks holding over 100,000 bushels. This wheat kept sweet for several weeks, although the temperature of the air beneath the steel roofs during warm, bright days reached 120° F. and higher during midday. There was no apparent change in the wheat except that it lost moisture around the steel sides and on top of the grain. This wheat was later transferred to concrete tanks and its behavior in them is being studied.

A cargo of wheat was accompanied from Philadelphia to Genoa, Italy, to determine the effect of grade factors on the keeping qualities of different lots of wheat during ocean transportation. In this connection, two other cargoes of wheat shipped from the United States were sampled at the Italian port of arrival and information was obtained on their condition at the time of discharge. The data on this work are being assembled for study in connection with efforts to assure the arrival of American grain in good condition in foreign ports and to perfect the grain standards to meet the requirements of ocean transportation. Samples have been collected from a boat loading at Astoria, Oreg., to determine the carrying qualities of the western-grown wheats which will pass through the Panama Canal to Europe.

COTTON HANDLING AND MARKETING.

The investigational and demonstrational work connected with cotton handling and marketing was conducted during the past year under the direction of Mr. Fred Taylor and later, owing to Mr. Taylor's resignation, by Mr. D. E. Earle. Mr. Taylor also supervised, until his departure, the projects "Marketing Cotton Seed and its Products," "Investigation and Demonstration of Cotton Standards," "Cotton Testing," and "Preparation and Distribution of Official Cotton Standards."

Demonstrations have been made to acquaint producers with the desirability of classifying their cotton before sale and to teach them how to use market quotations in determining the value of their crop. Approximately 236,360 bales were classed in this work in Texas, Arkansas, Louisiana, Mississippi, North Carolina, and South Carolina during the cotton season 1918-19. In addition to this, representatives of the Bureau assisted in organizing growers on a community basis, demonstrated the depressing effect of short-staple varieties upon prices, and pointed out losses incident to improper ginning, baling, and storing. This work has resulted in the enactment of State laws for the betterment of cotton-marketing conditions, especially in Texas, Arkansas, North Carolina, and South Carolina. These activities were conducted in cooperation with the extension divisions in the various States.

Texas growers, producing cotton of good staple and marketing it cooperatively, receive from $1\frac{1}{4}$ to 8 cents more for their cotton than was received for other cotton grown in the same community and sold by individual farmers.

A complete survey was made in Arkansas to determine the character of cotton produced and the conditions under which it was marketed. Approximately 76,500 bales of cotton were classed at Little Rock from samples sent in by ginners from 70 different counties of the State. A detailed study of the information gathered in this survey is being made for the benefit of the growers. The commissioner of mines, manufactures, and agriculture and the extension forces of the State cooperated actively in this work.

About 93 growers of Mississippi and Louisiana formed a cooperative association, and with the aid of a director of the Louisiana extension service and a representative of this Bureau, availed themselves of the advantages of marketing on the basis of grade and staple. Many of these planters used the classifications made by this repre-

sentative in the course of his demonstrational work as a basis for settlement with their tenants.

Demonstrational cotton marketing work was carried on last season at Raleigh, with branch offices at Tarboro, Wilson, and Lumberton, N. C., and at Darlington, Sumter, and Orangeburg, S. C. Approximately 85,000 bales were classed in these States. A survey also was made of the mills of both States with a view to determining the kind of cotton consumed, prices paid for such cotton, and the channels through which it was obtained. As a result of several years of continuous investigational and educational work associations have been formed in these States for the purpose of marketing cotton direct. The association at Orangeburg, S. C., has employed a seller who makes outside connections, assembles the cotton in large even-running lots, and sells direct to the representatives of mills and exporters.

MARKETING COTTON SEED AND ITS PRODUCTS.

Efforts to lessen the large amount of foreign matter, which annually is purchased, handled, and transported with cotton seed, have been continued as important economies could be effected if more care were taken in cleaning and protecting this product.

Investigations to determine the practicability of establishing standards for cotton seed have been continued, and an investigation has been undertaken to ascertain the average oil and ammonia content normally contained in seed grown in different sections of the cotton belt. The possession of such knowledge and the use of practical standards would enable millers and producers to trade on the basis of merit. An investigation also was instituted, in cooperation with the Bureau of Chemistry, to determine the relative qualities of different varieties of cotton seed when grown under practically the same conditions. It is hoped that this investigation will enable the Department to promote the growth of varieties that are superior both as to lint and oil.

Investigations have shown that in many instances cotton seed brought to the gin contains a large percentage of moisture. If the seed is not immediately crushed, this moisture often causes damage by inducing fermentation. It has also been found that cotton seed is often sold without reference to the moisture content, which has a most important bearing on its value.

A survey has been started, in cooperation with the Bureau of Plant Industry, to obtain information regarding the world's oleaginous materials and their products. The importation of these commodities into the United States has increased greatly during the past several years. This work was directed by Mr. Fred Taylor, assisted by Mr. C. F. Creswell.

COTTON WAREHOUSING INVESTIGATIONS.

A series of tests to determine the practicability of gin sampling and the extent of the damage sustained by baled cotton when exposed to the weather has been concluded and the results are being prepared for the use of the public. Standard warehouse designs have been prepared and persons adopting them are given the benefit of careful cooperative supervision in an effort to promote the construction of warehouses in accordance with the most advanced ideas. This work should save insurance costs and should aid in obtaining better ware-

house service. A comprehensive bulletin on cotton warehouse design and construction is now in press.

These investigations are directed by Mr. R. L. Nixon.

INVESTIGATION AND DETERMINATION OF COTTON STANDARDS.

This work was supervised by Mr. Fred Taylor, assisted by Mr. D. E. Earle.

On the 25th of October, 1918, grade standards were officially promulgated for Sea Island and American-Egyptian cotton and for length of staple, this action being the result of careful investigations undertaken in previous years.

In Arizona and California investigations were conducted to determine the applicability of the standards for American-Egyptian cotton to the crop of the past season. These investigations showed that the bulk of the 1918-19 crop conformed very closely to the standards. Marketing and shipping conditions were studied and laboratory tests were made to ascertain the moisture content and the breaking strength of the individual fibers of this cotton. Investigations also were made regarding its spinning qualities, waste, breaking strength, and weights upon arrival in the East. In the course of this work approximately 10,000 bales of cotton were classed.

A survey was made during the fiscal year at the principal marketing centers to determine the applicability to the past season's crop of the standards for Sea Island cotton. Several thousand samples were compared with the established standards and were found to conform with them approximately, except in a portion of the lower grades, which were somewhat bluer in color than the corresponding grades in the standards. Authentic information was gathered regarding the crop, prices received, and general marketing conditions.

COTTON TESTING.

The regular cotton-testing work of the Bureau was resumed during the past year after completion of the tests which were made in connection with the production of an improved airplane fabric for the War Department.

Preliminary tests were made to determine the relative spinning values of Sea Island and Meade cotton, which latter compares very favorably with inland Sea Island cotton.

A comparison was made of the manufacturing properties of "Middling Yellow Stained" cotton with an equal grade of cotton which was harvested and ginned before the fiber had reached a normal state of maturity, popularly known as "bolly" cotton. It was found that the total waste, exclusive of tare, from the "Middling Yellow Stained" cotton was 10.6 per cent and the total waste, exclusive of tare, from the "bolly," 16.8 per cent. Tensile strength tests proved that "Middling Yellow Stained" cotton was about 10 per cent stronger than the "bolly" cotton.

At Tempe, Ariz., tests were made to determine the advisability of using artificial humidity during the ginning process. This test showed no difference in the spinning value of the cotton ginned with and without artificial humidity.

This work was supervised by Mr. Fred Taylor assisted by Mr. D. E. Earle.

SERVICE WORK.

MARKET NEWS SERVICES.

Anticipating the discontinuance of emergency appropriations, some of the leased wire circuits of the Bureau, which formerly extended 15,000 miles, were abandoned before the close of the fiscal year 1919. On June 30 the leased wires used in connection with the live-stock news service were discontinued west of Kansas City and south of Cincinnati. The circuits used in connection with the services on fruits and vegetables and dairy products will be closed throughout the West on September 30 if no additional funds are made available. On account of the importance of this work as a factor in promoting the effective provisioning of our great cities with fresh food, and the undesirability of leaving the West and South without reliable market information, Congress has been requested to grant additional funds for this work. The leased wires now extend about 9,000 miles, having been reduced from the mileage mentioned above.

MARKET NEWS SERVICE ON FRUITS AND VEGETABLES.

As stated in the annual report for the fiscal year 1918, this work was greatly expanded with war funds and it was operated on this basis during the greater part of the past fiscal year, although, anticipating the discontinuance of emergency funds, many curtailments were effected during the last half of the year. Mr. W. A. Sherman is in charge of this work.

Reports were issued covering 31 commodities. These reports gave information regarding car-lot shipments, arrivals, and jobbing prices in the principal markets, and f. o. b. prices and other shipping-point information.

The following commodities were included in the program of the past fiscal year:

Apples.	Grapefruit.	Peppers.
Asparagus.	Grapes.	Prunes.
Bunched vegetables.	Green peas.	Spinach.
Cabbage.	Honey (semimonthly).	Strawberries.
Celery.	Lettuce.	String beans.
Cherries.	Mixed fruits.	Sweet potatoes.
Cantaloupes.	Onions.	Tangerines.
Cranberries.	Oranges.	Tomatoes.
Cucumbers.	Peaches.	Watermelons.
Dry beans.	Pears.	White potatoes.
Eggplant.		

During the greater part of the past fiscal year 32 market stations were operated in important consuming centers throughout the United States, as follows:

*Atlanta.	*Detroit.	*New Orleans.
*Birmingham.	* Fargo.	*Oklahoma City.
Boston.	*Fort Worth.	Omaha.
*Buffalo.	*Houston.	Philadelphia.
*Butte.	*Indianapolis.	Pittsburgh.
Chicago.	*Jacksonville.	Portland.
Cincinnati.	Kansas City.	St. Louis.
Cleveland.	Los Angeles.	San Francisco.
*Columbus.	*Memphis.	*Spokane.
Denver.	Minneapolis.	Washington.
*Des Moines.	New York.	

NOTE.—Stations marked with an asterisk discontinued during spring of 1919.

Temporary field stations were operated during the year 1918 at 71 points in the various producing sections during the important car-lot movement of the principal commodities listed above, 82 such stations having been maintained in the previous fiscal year.

There was a marked increase in the number of market reports distributed from market and field stations by telephone and telegraph during the past fiscal year. Subscribers receiving reports by telegraph pay the usual commercial charges on such messages. During the year 1918 the market stations released about 17,000 reports by telephone and 1,100 by telegraph. The temporary field stations in producing sections distributed approximately 2,600 reported by telephone and 1,500 by telegraph.

Approximately 23,000,000 mimeographed daily market reports were issued during 1918 to approximately 125,000 individuals throughout the country.

In addition to the daily market reports, a special "Weekly Review" of the markets was prepared in Washington. This Review was based on daily reports of the movement and prices of the important commodities and showed the trends and tendencies of the markets both in consuming and producing centers. It was sent to about 7,000 interested persons and to leading newspapers, trade publications, and farm journals.

The "Weekly Summary of Car-lot Shipments," showing the movement of the various commodities from each State during the preceding week as compared with the movement of the week previous and of the corresponding periods last year, was sent to transportation officials, members of the trade, educational institutions, and others interested in such statistics.

Semimonthly reports were released to about 3,000 persons interested in the honey shipments and markets.

MARKET NEWS SERVICE ON LIVE STOCK AND MEATS.

The market news service on live stock and meats, which is conducted under the direction of Mr. Louis D. Hall, was much expanded by the use of emergency funds as stated in the annual report for the previous fiscal year. With the expiration of these funds the service was greatly curtailed on July 1, 1919, all leased wires west of Kansas City and south of St. Louis having been closed.

During the year a branch office was established at San Francisco, and the service was extended temporarily to Jacksonville, Fla., Indianapolis, and Cincinnati. By these additions the number of branch offices with leased-wire service was increased to 20. The daily reports on meat trade conditions were continued with the addition of price quotations on wholesale pork and veal cuts. These reports were expanded to include trade conditions and prices at Chicago and San Francisco and a "flash wire" indicating the trend of early trading also was added. Both the daily and weekly reports were improved by condensing the text, which made them more readily useful to the trade. Approximately 3,500,000 copies of each of the various daily reports and 750,000 copies of the weekly reports were distributed during the year.

Early in the fiscal year arrangements were made to issue the report on live-stock loadings from Chicago instead of Washington in order

to expedite the receipt of the information and to reduce operating costs. It also was found desirable to condense and combine certain reports which are now issued as the "Daily Live Stock and Meat Trade News," more than 20,000 copies of which are being distributed each week. This report includes estimated live-stock receipts at 8 to 10 markets for the day on which the report is released, actual receipts of the previous day at the market from whence the report is issued, the disposition of stock received at this market, and meat trade and live-stock conditions and prices at various markets. Monthly receipts and disposition of live stock at public stockyards are compiled and published and arrangements have been made for more complete and uniform reports from stockyards companies. Reports are now received from 79 stockyards in 71 cities.

Reports concerning the "in" and "out" movement of live stock in grazing and feeding districts were continued, and the live-stock feeders in the districts of Lancaster, Pa., northern Colorado, and the Arkansas Valley of Colorado were furnished current information relative to the movement of live stock from their districts.

Owing to urgent demands the telegraphic reporting service, which was begun during the previous year at Chicago, was extended to include the live-stock markets at Kansas City, Omaha, and East St. Louis. This service consists of a series of telegraphic reports issued at intervals during each market day. The early reports give estimated receipts and the later reports give actual market conditions and prices on all classes of live stock. Through the commercial news departments of telegraph companies, the press associations, and other agencies in addition to the Bureau's branch offices, this service is made available to interested persons both at market centers and country points throughout the United States.

Following the armistice there was a general demand that the monthly survey of stocks of hides and skins which was conducted during the war by the Tanners' Council be continued by this Bureau. In January, 1919, this work was undertaken. In the course of this survey information is collected regarding the supply of domestic and foreign hides and skins on hand and in transit at the close of business on the last day of each month as reported by packers, dealers, importers, and tanners. Summaries of these reports are compiled and distributed.

During the fiscal year 1919 reports were issued each quarter showing the stocks of wool held by manufacturers and dealers throughout the United States. These reports also showed the stocks of wool held by the Government on March 31 and June 30, 1919. More than 98 per cent of the manufacturers and dealers in wool submitted statements from which these reports were compiled.

Monthly reports were made of the consumption of wool, these reports having been prepared from schedules returned by 99 per cent of all of the manufacturers in the United States using wool in the production of their goods. A monthly census of the active and idle wool machinery in the United States was commenced in November, 1918. Detailed reports on wool market prices were issued in May and June, 1919, and during the latter part of the year monthly statements were instituted regarding the amount and condition of the wool imported into the United States monthly under the present import classification.

MARKET NEWS SERVICE ON DAIRY AND POULTRY PRODUCTS.

This news service, which is supervised by Mr. Roy C. Potts, was financed from emergency funds in the fiscal year 1919. Daily market reports on butter, eggs, and cheese were issued from Washington and from the branch offices located at Boston, New York, Philadelphia, Chicago, Fond du Lac, Minneapolis, Denver, San Francisco, and Portland. They were sent to a mailing list composed of the names of over 7,000 persons and firms, each of whom had made specific requests for the reports.

The reports also included information regarding stocks in storage in certain markets daily, the stocks existing in the entire country semimonthly, receipts and current trading stocks at the principal distributing markets, receipts of cheese from factories and stocks in the hands of dealers in the primary markets of Wisconsin, and wholesale prices received by butter and cheese dealers in the wholesale distributing markets and by cheese dealers in the primary markets.

HAY AND FEED REPORTING SERVICE.

During the fiscal year 1918-19 the Hay and Feed Reporting Service, supervised by Mr. C. S. Cole, with field offices at Washington, Atlanta, Fort Worth, Minneapolis, Chicago, Kansas City, Spokane, and San Francisco, published a "Weekly Market Review" of prices, and conditions affecting them, in the principal markets of the country.

This Review was mailed on Saturday of each week to approximately 12,000 producers, dealers, and consumers of hay, feed, and grain who requested it. Special attention was given in this Review to supply of and demand for hay and feed.

On account of a serious emergency caused by drought, offices were established during the year at Bozeman, Mont., and Fort Worth, Tex., through which 5,047 cars of hay and feed were handled. This work aided in saving thousands of cattle from starvation.

SEED REPORTING SERVICE.

During the fiscal year ending June 30, 1919, six branch offices, at Chicago, Kansas City, Minneapolis, Spokane, San Francisco, and Atlanta, were maintained in connection with this service. Mr. W. A. Wheeler directed this work.

By means of informal inquiries sent to voluntary reporters, growers, shippers, and dealers, and by personal visits, information was obtained and transmitted to Washington, where much of it was assembled and worked into articles or reports for publication in the "Seed Reporter." The most important reports published may be classified as (1) outlook reports, including figures and descriptive matter concerning acreage, yield per acre, quality and prices of field seeds; (2) shipment reports, including stocks in shippers' hands, carry over in growers' hands, shipments during the last season, shipments during the current season, etc.; (3) seed market reports, including trade information—supply, demand, prices, movement, etc., at some of the most important seed-marketing points; and (4) vegetable seed crop condition reports, from the most important seed-producing sections. The publication of these reports made timely information available to the small grower, small shipper, and small

dealer which in the past has been in the possession of comparatively few of the largest seedsmen and commercial seed growers. Twelve issues of the "Seed Reporter" were published and mailed monthly to approximately 23,000 growers, shippers, dealers, and other interested persons.

In addition to the reports mentioned, the results of two national seed surveys were published. Besides stocks, receipts, and exports of field and vegetable seeds, these surveys covered sales of certain kinds of field seeds and acreage and production of vegetable seeds. Through the information obtained in these surveys, it has been possible to facilitate the movement of seeds from producer to consumer, and to reduce inflation in seed prices.

CITY MARKET REPORTING SERVICE.

The City Market Reporting Service was conducted during the last fiscal year with emergency funds, under the supervision of Mr. G. V. Branch, in order to furnish a market news service to farmers in the vicinity of large markets who require information of a different character from that furnished to distant carlot shippers, and to keep city consumers informed of market conditions in order that the consumption of abundant products might be facilitated to the advantage of both producers and consumers. Market reports of this sort were issued during the year from 16 offices: Baltimore, Md.; Boston, Mass.; Bridgeport, Conn.; Chicago, Ill.; Cleveland, Ohio; Denver, Colo.; Detroit, Mich.; Hartford and New Haven, Conn.; Philadelphia, Pa.; Providence, R. I.; St. Paul, Minn.; Springfield, Mass.; Waterbury, Conn.; Washington, D. C.; and Worcester, Mass. The offices in St. Louis, Mo., and Lawrence, Mass., where the service had been maintained during the preceding fiscal year, were closed because it was not possible to secure men properly equipped to carry on the work.

The work in the 16 cities named was continued along the lines followed in the preceding year. Reports for growers were enlarged and perfected and were issued each market day, about 30,000 farmers and 600 dealers being reached. The reports were distributed on the market and by mail and in some cases were published in local newspapers. Reports for consumers were furnished to newspapers which publish them regularly in most cases.

During the fiscal year active cooperation was maintained with local representatives of the Federal Food Administration in the publication of its fair-price lists. On account of the discontinuance of emergency funds this work was closed on June 30, 1919.

EMERGENCY TRAFFIC AND STORAGE ASSISTANCE.

In order to render special assistance during the war, transportation men were sent to heavy producing sections to work in close cooperation with shippers and carriers to avert shortages of cars and ice for refrigeration in transit; to secure heavier and better loading; to procure more efficient service for shippers, and to bring about the best possible utilization of equipment. Although this work was first undertaken during the war, it should be continued in peace times so far as funds are available. Mr. G. C. White directs all work of this character.

During the past year work of this kind was done in the Salt River Valley of Arizona, at Turlock, Calif., at Spokane for the entire Northwest, and at Brawley, Calif., for the Imperial Valley.

FOOD PRODUCTS INSPECTION SERVICE.

FRUITS AND VEGETABLES.

Food products inspection offices were maintained during the past fiscal year in an average of 30 important markets. The service was discontinued in four of the less important markets and new offices were opened in Columbus and Milwaukee. A total of 164 markets were designated as inspection points, most of these being served by inspectors stationed in the branch offices at the important central markets. About 15,000 inspections were made during the year. Mr. W. M. Scott and Mr. C. T. More supervised this work during the past fiscal year.

Amendments to the authority under which the inspection service is conducted, which became effective October 1, 1918, made the service available not only to shippers but to receivers, railroads, and other persons financially interested. Amendments also provided that a fee should be charged for each inspection.

Shippers in all parts of the country are using the service with increasing frequency, and receivers in the markets in which inspectors are located avail themselves of it very generally. The railroads also are making a more general use of its facilities, and in some markets try to secure an inspection certificate on each car or each lot of fruits and vegetables regarding the quality or condition of which there appears to be a question and a likelihood of a future claim. The heaviest demand for inspections has existed in the Eastern and Middle States.

During the first half of the fiscal year close cooperation was maintained with the United States Food Administration. Its Federal, State, and local administrators used the inspection certificates continually since they found them a necessary basis for adjusting a large number of claims between shippers and receivers. Work of a cooperative and advisory nature also was conducted with the Army and Navy, the inspectors occasionally visiting cantonments and other military posts in order to give advice to camp quartermasters regarding the grading, handling, and inspection of fruits and vegetables. In New York City several men were assigned to inspect supplies of fruits and vegetables for naval vessels and transports. This enabled the Navy Department to effect economies and to obtain supplies of fruits and vegetables of better quality with less waste than otherwise would have been possible.

That the inspection work has been very favorably received by all interests concerned is evidenced by the increasing use which shippers, receivers, and carriers are making of its facilities. Many requests have been received during the year from trade and commercial organizations for the establishment of the service in the cities which they represent, but it has been necessary to decline practically all of these requests because of limited funds.

The Bureau of Markets has had the fullest cooperation of specialists of the Bureau of Plant Industry, who are working to combat fruit and vegetable diseases. They have rendered especially valuable

assistance in training market inspectors to identify the more important diseases, and also in preparing valuable hand-colored books illustrating the effects of diseases on fruits and vegetables.

BUTTER.

The butter inspection service, which was instituted during the past year on a small scale, was supervised by Mr. R. C. Potts. Regulations covering the inspection of butter were published in Service and Regulatory Announcements No. 51. This service was conducted in New York, Philadelphia, Chicago, and Minneapolis.

STORAGE REPORTS.

For the greater part of the fiscal year 1919 this work was done under the direction of Mr. C. W. Thompson, assisted by Mr. John O. Bell. The storage reports issued by the Bureau of Markets show the reserve supply of some of the more perishable foodstuffs, and deal for the most part with holdings in cold storage. These reports cover seven classes of foodstuffs, namely, apples, butter, cheese, eggs, frozen and cured meats, frozen poultry, and frozen and cured fish. These classes are subdivided into 50 different items, including 5 kinds of frozen poultry, 7 varieties of cheese, and 25 varieties of fish.

For convenience in tabulating the returns the country is divided into eight geographical sections, as follows: New England, Middle Atlantic, South Atlantic, North Central East, North Central West, South Central, Western North, and Western South. Blank forms are furnished to the 1,400 cold-storage firms in the United States on which to submit their reports. The reports submitted to the Bureau come from the warehousemen and show quantities in storage, regardless of ownership. In addition to showing actual quantities of different commodities in storage on a specified date, certain comparisons are made with reports of other months in order to indicate the relative amount in storage, as compared with previous dates, and the increase or decrease in holdings during the month. Comparison of the holdings of the current month with the same month in the previous year is made for each geographic section, while comparison concerning the current and preceding month covers the whole United States.

PURCHASE AND DISTRIBUTION OF NITRATE OF SODA.

The purchase and sale of nitrate of soda to farmers was continued in 1919 under authority of section 27 of the food control act, with Mr. J. H. Collins acting directly in charge.

In 1918 nitrate was purchased in Chile and was sold to farmers at \$75.50 per ton of 2,000 pounds. One hundred and twenty thousand tons were purchased, but only 75,000 short tons were received in sufficient time to be distributed during the season of 1918 and about 40,000 tons remained on hand for sale in 1919.

The signing of the armistice and the sudden termination of the war left in the possession of the War Department a large quantity of nitrate which had been purchased and imported for use in manufacturing munitions. The Department of Agriculture arranged to secure about 115,000 tons of this nitrate at salvage rates, and announced a price of \$81 per short ton, f. o. b. shipping point or port.

The fact that the 40,000 tons carried over from 1918 were bought at a lower price and sold at \$81 per ton enabled this Department to sell the entire quantity of nitrate distributed during the past fiscal year at only a very slight advance over the War Department's salvage price.

Essentially the same plan of distribution was followed as in 1918. Orders were taken from about 100,000 farmers by county agricultural agents and committees appointed to assist them. As in 1918, nitrate was shipped to the county nitrate distributors on "order notify" bills of lading, with sight drafts attached. These county distributors collected from farmers purchasing the nitrate and also distributed the nitrate on arrival.

Distribution of nitrate to farmers in 38 States was made from 21 storage points. In all cases farmers were given the benefit of the most advantageous freight rates. The first shipments of nitrate went forward during the latter part of January and distribution was not completed until late in June. The bulk of the shipments went forward during the months of March and April.

The smallest application was for one-tenth of a ton; the largest individual application was for 300 tons. A total of nearly 153,000 tons was sold during the year. On the basis of retail prices as reported to the Department, the saving to farmers through the purchase of this nitrate exceeded \$2,000,000 this year.

All applicants received their full quota and practically all shipments went forward in ample time for use during the season.

On June 30, 1919, there remained on hand 1,718.8 short tons of nitrate for which application had not been received. Under the agreement of the purchase this is returnable to the War Department.

REGULATORY WORK.

ENFORCEMENT OF THE UNITED STATES COTTON FUTURES ACT.

The administrative work connected with the enforcement of the cotton futures act is under the general supervision of Mr. D. S. Murph. The enforcement of the act is carried out under the following projects:

INVESTIGATIONS OF FUTURE AND SPOT MARKETS.

These investigations are directed by Mr. George R. Argo. Securing accurate quotations for different grades of cotton, especially in the case of low grades, has been increasingly difficult during the past season owing to the wide divergence in prices in different sections of the cotton belt. Low-grade cotton has been quoted at the widest discount off Middling, the basis grade, ever known to the cotton trade. Quotations for Good Ordinary have been published by spot exchanges as low as 1,200 points off Middling, and doubtless cotton of this grade has sold at greater discounts at interior points. The possibility of the delivery of future contracts of cotton of this character at differences that were unduly narrow resulted in an abnormal disparity between spots and futures, but the readjustment was rapid as soon as quotations for differences were widened to the approximate selling value of low-grade cottons. Such widening also resulted in creating a broader market for low-grade cotton. Under an amendment to the cotton futures act, by the wheat price guaranty act of

March 4, 1919, authority has been granted the Secretary of Agriculture to require reports of purchases and sales of spot cotton in order to secure accurate quotations for the various grades. This information will be especially valuable to the producer when it relates to cotton below Low Middling on account of the untenderability on future exchange contracts of the low grades and the comparative lack of authentic information available to the producer as to their value. It is intended to publish all such information that will be of value to the public.

Representatives of the designated spot markets held a meeting in Memphis in April, 1919, to devise a uniform system of quotations by the spot exchanges. A tentative plan was adopted and submitted to the exchanges for ratification, effective August 1. It appears that substantially all the exchanges have agreed to adopt the plan.

DETERMINATION OF DISPUTES AND CLASSIFICATION OF COTTON FOR DELIVERY ON FUTURE CONTRACTS.

The number of disputes increased materially during the last fiscal year owing to the fact that a large quantity of low-grade cotton was delivered on future contracts. For 1919 a total of 493 disputes were received and passed upon as against 146 in 1918. The total number of bales of cotton involved was 29,303 as against 6,895 in 1918. The amount of money collected for determining the disputes was \$9,066.68 as against \$2,202.30 in 1918. This fund was covered into the Treasury of the United States in accordance with the provisions of the United States cotton futures act.

In accordance with an amendment to the United States cotton futures act by the wheat price guaranty act of March 4, 1919, all cotton to be delivered on future contracts is now classified by the Department of Agriculture, and no further disputes will be heard, except possibly on some old-style contracts outstanding that may be settled by delivery of cotton in fulfillment thereof. Very few old-style contracts, however, are outstanding, and the likelihood of further disputes is remote.

As the amendments to the cotton futures act became effective on March 4, 1919, the date of their enactment, there was some unavoidable delay and inconvenience both to the trade and the Government in the execution of their provisions. The delay in beginning actual classification of cotton at the New York and New Orleans Exchanges occasioned by the necessity for providing an organization and the time required for drafting regulations for this work, however, was not considerable, and only slight inconvenience was caused to the cotton trade with respect to deliveries of cotton on contracts entered into after March 4. Conferences were held with members of the two future exchanges, temporary regulations were adopted, and classification was begun at New Orleans on March 24. Classification for New York began on April 4. Approximately 30,000 bales were classed in New York during April and May for delivery on May contracts and the work was satisfactorily performed with no further delay to the trade. Final regulations governing the classification of cotton for future delivery under section 5 of the cotton futures act were adopted by the Secretary on May 20, 1919, and became effective immediately.

Cotton classed to June 30 in New York amounted to 37,354 bales; in New Orleans, 6,741 bales.

Owing to the congestion at the warehouses in New Orleans, delivery of spot cotton on future contracts has been considerably less than normal.

PREPARATION AND DISTRIBUTION OF OFFICIAL COTTON STANDARDS.

During the greater part of the fiscal year this work was supervised by Mr. Fred Taylor, and after his resignation by Mr. D. E. Earle.

Since the standards for grade of upland cotton were promulgated in 1914, and up to June 30, 1919, 1,145 full white and colored sets and 296 fractional colored sets were sold. On August 1, 1918, the price of each box of all grade standards was advanced from \$2.50 to \$5 on account of increased cost of labor, material, and transportation. Every important cotton exchange and spot market in the United States has adopted these standards and uses them as a basis of daily quotations.

Official cotton standards for American-Egyptian and Sea Island cottons and standards for length of staple were established and promulgated effective October 25, 1918. Thirty-four full sets and one fractional set of American-Egyptian grade standards, four full sets of American Sea Island standards, and 72 sets of the standards for length of staple have been sold to the trade since their promulgation. A method of pulling staple has been devised and recommended for adoption by the trade.

During the fiscal year ending June 30, 1919, \$37,840.71 was covered into the Treasury as miscellaneous receipts—\$31,987.71 from the sale of miscellaneous and rejected cotton and \$5,853 from the sale and revision of copies of the standards.

ENFORCEMENT OF THE UNITED STATES GRAIN STANDARDS ACT.

The enforcement of the United States grain standards act was carried out in its third year under the direction of Mr. George Livingston.

On July 15, 1918, the standards for both shelled corn and wheat were revised. The revision in the case of the corn standards was slight, while the changes in the wheat grades were greater. As a result of these changes the percentage of the 1918 crop of wheat which fell into the higher grades was considerably higher than the percentage of the 1917 crop so falling. Available data show also that a larger percentage of the 1917 crop, which was graded by the original standards, fell into the top grades than would have been true had former diverse State and local standards been applied. The fixed price for wheat, which was based upon the Federal grades, resulted in the use of these grades in practically all sales of wheat made throughout the United States during this period, and consequently close cooperation was maintained with the Grain Corporation of the Food Administration.

On June 16, 1919, the Federal standards for oats were made effective and seem to be giving general satisfaction. These standards had been discussed with producers, grain shippers, elevators, warehousemen, and other members of the trade prior to their publication

and public hearings also were held. The grades also were tried out experimentally for several weeks before they were finally put into effect.

As the result of conferences with representative members of the grain trade a committee was selected late in the fiscal year to investigate conditions at inspection points east of the Rocky Mountains. This committee was selected by the grain trade and was composed of representatives of the Grain Dealers' National Association, the National Council of Farmers' Cooperative Associations, the Council of Grain Exchanges, the Millers' National Federation, and the Car Service Section of the Railroad Administration. All phases of the work performed in enforcing the grain standards act were considered, and the report of the committee shows that the trade and most of the inspection departments consider the Federal standards satisfactory when uniform methods and equipment are used, and that where proper cooperation was maintained between the various agencies concerned the enforcement of the act was proceeding in an entirely satisfactory manner. The committee recommended that an amendment to the grain standards act should be made in order to permit the entertaining of appeals on the grading of intrastate shipments by licensed inspectors and that grain samplers should be licensed under the act in the same manner that inspectors are licensed.

It became evident at the beginning of the fiscal year that closer contact with the actual work of supervision, inspection, and grading was necessary, and in January a field headquarters office was established at Chicago, Ill., within one night's travel of most of the great grain markets of the country.

Chicago also was made the headquarters of the board established during the past fiscal year to review the grade determinations made in the 35 branch offices. Since its organization during the past fiscal year, this board has reviewed 3,837 samples submitted by the various supervision offices and considered appeals from shippers who were dissatisfied with the decisions made by supervisors on appeals from inspections by licensed inspectors. This board also has reviewed, analyzed, and tabulated its findings with regard to 1,500 samples of oats from various supervision offices, and has prepared 185 type trays showing the effect on oats of damage and heat damage, the various classes of oats, and the minimum color requirements for oat grades. These trays are used as guides in grading oats.

In order to supervise more intimately the work of inspectors and promote uniformity and efficiency in the inspection work, a total of 53,149 grain samples have been examined in the various branch offices during the past fiscal year.

Twenty-six demonstrations showing the methods of grading grain and the proper use of grain-grading apparatus were made at State and county fairs in Minnesota, Montana, Iowa, North Dakota, Texas, Ohio, Nebraska, Washington, and Kansas, and 17 demonstrations were made at meetings of grain dealers' associations in Ohio, Texas, Kansas, Kentucky, North Dakota, Arkansas, Iowa, Missouri, Illinois, Colorado, Minnesota, and Georgia. Thirteen grain-grading schools were conducted in cooperation with the agricultural colleges in Idaho, Ohio, Missouri, Iowa, Oregon, and Michigan. This work has been productive of highly beneficial results and has been well received by producers and the trade.

Investigations were made of 58 cases of apparent violations of section 4 of the grain standards act regarding shipment of grain without inspection. Four of these cases have been referred by the Solicitor of the Department to the Attorney General for prosecution and another is now being prepared for transmission. Twenty cases involving misgrading of grain under the provisions of section 5, covering representations of grade other than those shown on inspection certificates, have been investigated, and in three cases the findings of the Secretary of Agriculture have been published. Some shippers have voluntarily restored large sums of money to buyers where violations of the act have been brought to light. Thirteen cases, involving violations of section 7, owing to certifications by persons not holding licenses, have been investigated as well as 11 cases involving charges against licensed inspectors under the same section. One case involving violation of section 10 also has been investigated.

Questions involving certification of cargo shipments of grain on the Great Lakes and the use of private brands by large shippers and exporters have been investigated to determine whether violations of the act are involved.

During the year 446 licenses were issued, two licenses were revoked, and 125 examinations were held to determine the eligibility of persons desiring to secure licenses. Twenty applicants for licenses were found unqualified.

During the year 6,651 appeals were filed through the supervision offices. The grades assigned by the licensed inspectors were found to be correct in 3,295 cases, while 3,293 cases showed the inspector to be in error. Sixty-three appeals were dismissed.

Nine disputes, representing controversy as to the grade of grain shipped between noninspection points, were handled during the year.

ADMINISTRATION OF UNITED STATES WAREHOUSE ACT.

The administration of this act is under the supervision of Messrs. D. S. Murph and R. L. Nixon. Recent amendments which were contained in the appropriation bill for the current year should do much to popularize the act, and it is hoped that warehousemen will take out licenses in increasingly large numbers now that certain obstacles have been removed. The State of North Carolina recently has adopted a law providing for a State system of licensed warehouses, and close cooperation will be maintained between this Bureau and the State officials who direct this work.

Licenses have been issued to five cotton warehousemen and nine cotton weighers and classifiers during the fiscal year, and applications are on file from 28 additional warehousemen. As soon as the necessary bonds are supplied, licenses will be issued to these applicants.

Substantial reductions in the cost of insuring licensed warehouses have been secured from rating bureaus in the South.

Approval of forms of receipts to be used under the regulations has been secured from the Federal Farm Loan Board and steps have been taken to secure like approval from the Federal Reserve Board.

Proposed regulations for grain warehouses have been issued and public hearings have been held. These regulations are now being

prepared in final form and the Department will be ready to consider applications from grain warehousemen in the near future.

Regulations for tobacco and wool warehouses are in the course of preparation.

ENFORCEMENT OF THE STANDARD CONTAINER ACT.

During the past year the enforcement of the standard container act was supervised by Messrs. W. M. Scott and C. T. More, assisted by Mr. F. P. Downing.

On account of the cooperation of package manufacturers, the work connected with the enforcement of the United States container act has been largely educational and corrective, one prosecution only having been brought against a manufacturer for violation of this law. In this case the defendant pleaded guilty. Shippers, manufacturers, the wholesale trade, and retailers have expressed great satisfaction with the results of the operation of this legislation. It has served to remove some of the unnecessary differences in size of packages and simplifies the marketing problem to that extent. Manufacturing plants in all parts of the country have been visited and their products have been tested. During the past year particular attention has been given to the packages manufactured in the Rocky Mountain and Pacific Coast States.

SUPERVISION OF STOCKYARDS AND LIVE-STOCK DEALERS.

The supervision of licensees operating stockyards or dealing in or handling live stock in or in connection with stockyards, as authorized by the President's proclamation of June 18, 1918, is conducted by the Bureau of Markets under the direction of the Secretary of Agriculture. Mr. Louis D. Hall is directly in charge of this work. A total of 2,803 licenses were in effect at the end of the past fiscal year. General regulations governing licensees were issued July 26, 1918, as Circular No. 116 of the office of the Secretary of Agriculture. These regulations were supplemented on September 24, 1918, in accordance with a proclamation of the President dated September 6, 1918, which extended the authority to include the live-stock buying activities of packers and the handling of dead stock by rendering concerns.

A corps of market supervisors was organized as rapidly as practicable and stationed in 26 important live-stock markets. One hundred and twenty-one licensed stockyards were placed under the supervision of the officers at the 26 central markets in whose respective districts they were located.

Complaints regarding various alleged violations of the regulations have been heard and acted upon, and other specific matters requiring adjustment by the local supervisors have been considered. The following instances afford an illustration of the numerous and varied cases that have been dealt with. Adequate facilities and service have been provided at a number of poorly equipped stockyards; new scales, pens, chutes, and other equipment have been put in; the cleaning of dirty pens has been made obligatory; arrangements for loading, unloading, and moving stock through stockyards have been improved and additional yardmen have been employed; terminal railroads have been required to furnish faster service, thus eliminating a

large amount of delay and shrinkage; unsuitable feed has been rejected; more accurate checks on weights of feed have been provided, and feed charges have been reduced in some cases at the instance of the market supervisors.

The books of commission firms and stockyard companies at a number of the large markets were examined for the purpose of determining whether increased charges for handling live stock were justified under the regulations, and a number of public hearings on this subject were held. The examination of these books disclosed several instances of overcharges on feed accounts. One licensee made restitution through the Bureau of Markets of more than \$20,000 to his consignors in amounts ranging from a few cents to more than \$900. Action in several other cases is pending; these involve overcharges aggregating approximately \$40,000. One commission firm has been obliged to restore to consignors amounts aggregating over \$18,000 which it wrongfully withheld when remitting for sales, and its license has been surrendered. The license of a firm found guilty of stealing live stock has been revoked. Some of the live-stock exchanges have passed new rules forbidding certain practices which are contrary to the spirit of the regulations, such as the use by commission firms of "cripple buyers" as yardmen, and the giving of tips to stockyard employees for special privileges in yarding stock. Partiality in the assignment to commission men and traders of pens and weighing arrangements has been eliminated at some of the important markets.

Besides the numerous specific cases which have been dealt with, many irregular and injurious practices have been eliminated voluntarily by the companies concerned in order to comply with the regulations. The mere presence of the supervisors at the markets has had a salutary effect. Numerous testimonials have been received regarding the wholesome effect of this service and the improvement of business practices and conditions at the stockyards.

A comprehensive investigation of the market classification of live stock was made to assist in establishing uniform standards on which to base price quotations at the various markets. The investigation resulted in the adoption of a tentative classification for the guidance of the supervisors and reporters at licensed stockyards. Preliminary arrangements were effected for recording and reporting live-stock and meat shipments from some of the principal market centers.

REPORT OF THE CHIEF OF THE OFFICE OF FARM MANAGEMENT.

H. C. TAYLOR, *Chief.*

Reorganization of the Office of Farm Management in accordance with a plan determined upon in a conference on reorganization held early in the present calendar year has now progressed so far that work is being inaugurated along the new lines of investigation provided for in the revised outline of projects. The office enters the new fiscal year with the preliminary work in this regard well in hand.

Under the plan adopted, the field of research work covered by the office has been divided into seven sections, as follows:

1. Cost of production.
2. Farm organization.
3. Farm financial relations.
4. Farm labor.
5. Agricultural history and geography.
6. Land economics (including land ownership and tenancy).
7. Farm life studies.

Cost of production studies along the lines suggested by a committee appointed by the Secretary to make recommendations in this regard have begun under the direction of Mr. F. W. Peck. Mr. Peck is also directing, temporarily, the work in farm organization. Dr. L. C. Gray, in charge of land economics, has outlined a series of inquiries in land ownership and tenancy, land settlement and colonization, and land policies. Farm life studies have been inaugurated under the direction of Dr. C. J. Galpin. Of the remaining sections, Agricultural History and Geography is identical with the old section of History and Distribution of Farm Enterprises; that of Farm Financial Relations is being established by transfer of existing groups from the Bureau of Markets; and that of Farm Labor remains to be organized.

Owing to the fact that practically all the research work done during the past year was done under the old plan of organization, the following detailed report of progress, for the most part, is arranged according to the old classification.

COST OF PRODUCTION.

Eight hundred and sixty-five cotton-enterprise records, together with the necessary farm organization data, were obtained from cotton growers in four of the southern States during the months of May and June, 1919. These records were distributed as follows: 162 representing two districts in Texas; 269 from three areas in Alabama; 254 from three sections in Georgia; and 180 from two areas in South Carolina. This material embraces staple factors of cotton and will allow the estimations of cost by using current prices.

Cooperative costs of production studies of the tobacco crop were instituted in May with the Kentucky Experiment Station. This enterprise study entails the cooperation with 160 representative tobacco growers in which the tobacco enterprise is studied in detail and in relation to the entire farm business.

Arrangements are being made with a number of the States looking toward cost accounting investigations to begin with the new farm year of 1920. A cost of tractor operation and farm organization study was arranged with the Ohio Experiment Station, the work in the field to begin July 10.

Tentative plans have been laid for making studies in the cost of producing wheat and sugar beets, and for special investigations in live-stock economic problems.

FARM BUSINESS ANALYSIS STUDIES.

Studies of the business side of farming and of factors affecting the profitable organization of farms have made substantial progress

during the year. An additional year's work on continuing surveys of farms has been inaugurated in the following areas:

Seventh year of the study of farms in a representative area of the hill land drained by the Ohio River (Washington County, Ohio).

Sixth year of the study of farms in a representative area of general farming in the Corn Belt (Clinton County, Ind.).

Third year of the study of farms in a representative area of fruit and general farming in the Shenandoah Valley (Frederick County, Va.).

Second year of the study of farms in a representative area of truck farming in Florida.

Second year of the study of farms in a representative area of the citrus fruit industry in Florida.

Second year of the study of small farms in the vicinity of Columbus and Cleveland, Ohio, and Indianapolis, Ind.

In cooperation with the Wisconsin College of Agriculture, the sixth year of the study of farms in Dane County, Wis.

These studies show in more or less concrete fashion the profits in farming over a period of years in a given area or for a certain type of farming. They give light on the effect, not only of those factors over which the farmer exerts more or less control, but also something regarding the effect of many factors over which he has little or no control.

In connection with these studies the results of the five-year study in the hill-land section of the Ohio River have been published as Department Bulletin 716, "A Five-Year Farm Management Survey in Palmer Township, Washington County, Ohio, 1912-1916." Department Bulletin 694, "A Study of Farm Management Problems in Lena'wee County, Michigan," covering the results obtained in a typical dairy farming area in southern Michigan, was also issued during the year.

CROP ECONOMICS.

During the year material was collected in western New York with special reference to labor-saving devices in handling the apple crop. Supplementary data were also secured in connection with a survey which was made in the apple-growing districts of western New York about two years ago. This practically completes the list of reports relating to the cost factors in the production of apples under various conditions in the United States. No new work was started on apples during the year.

Progress was made in bringing to completion a part of the investigational work on hay. In 1918 records were taken in the alfalfa and Johnson grass districts of Alabama and Mississippi. Two descriptive bulletins, namely, Farmers' Bulletin 1009, entitled "Hay Stackers," and Farmers' Bulletin 1049, entitled "Baling Hay," were published during the year.

Prior to 1918 a large number of estimates were obtained from farmers on the production of corn silage, particularly with reference to the effect of the degree of maturity on yields, shrinkage and wastage in storage, and the relative costs of different methods of handling this crop. A careful analysis has been made of the information contained in these records and comprehensive reports have been prepared summarizing the results.

Two hundred and eighty-five sugar-beet enterprise records were obtained in the irrigated districts of Colorado during the summer of 1918. These records were concerned chiefly with the labor require-

ments of such crops as alfalfa, barley, wheat, oats, beans, corn, etc., which are grown in the beet-producing sections. Three publications on sugar beets were issued, namely, Department Bulletin 748, "Farm Practice in Growing Sugar Beets in Michigan and Ohio," Department Bulletin 760, "Farm Practice in Growing Sugar Beets in Three California Districts," and Farmers' Bulletin 1042, "Saving Man Labor in Sugar Beet Fields."

LIVE-STOCK ECONOMICS.

In the field of live-stock economics studies of the costs of growing and of fattening beef cattle, which covered a number of the large western ranches and selected areas in the corn-belt region, were undertaken in cooperation with the Federal Trade Commission, and the data obtained have been worked up and submitted to the commission.

Data are now being gathered on the cost of fattening beef cattle for the market. Cooperative relations have been established with the Bureau of Animal Industry, and financial cooperative relations have been arranged with Indiana and Illinois for the carrying on of this investigation.

FARM BOOKKEEPING AND COST ACCOUNTING.

Cooperative investigations in cost accounting on individual farms and studies of systems of bookkeeping and cost accounting in use by farmers and agricultural interests in general have been continued.

Work done in the field has consisted of visits to cooperating farmers for the purpose of making inventories, measuring crop areas, and securing other data necessary for the completion of records, and conferences with county agents and farmers seeking advice and assistance in farm accounting work. Current office work has included the posting, tabulating, and summarizing of cooperators' records, and the handling of a considerable mass of correspondence and personal inquiry from individuals interested in farm accounts or cost accounting.

In addition to routine work, a special study has been made in connection with the farm labor problem created by the war. In this connection, labor requirement data, by months, for each crop or other farm enterprise and for the farm as a whole, were tabulated for 69 farm years, covering representative farms in four agricultural regions.

TENANCY AND FARM-LABOR PROBLEMS.

On account of the urgent demand for practical work on the subject of farm labor, a part or all of the time of the men engaged on tenancy projects of the office was withdrawn from that subject and devoted to farm labor or some other related matters. On this account it was impossible to do much field work during the year. Material on the subject of renting land devoted to sugar beets, on stability of tenure of the farm operator, and on methods of renting farms in the wheat belt of the Central West was worked up. Some work was also done on data relating to the general subject of renting farms, the renting of land devoted to small grains, the renting of dairy farms, systems of renting by stock shares, and the rent rela-

tions existing between landlord and tenant on a New York farm. Additions were made to the large collection of leases in possession of the office, and the files of these were indexed to make them more readily available.

The farm-labor operations were conducted along the lines which were pursued during the previous fiscal year. Farm-help specialists were maintained in practically every State. These men worked in co-operation with the extension divisions of the agricultural colleges, particularly the county agents, and also with the State departments of agriculture, State departments of labor, and other State organizations concerned with the labor problem, and finally with the United States Employment Service and other employment offices. The farm-help specialists took an active part in organizing local farm-labor business.

Attention was chiefly devoted to the problem of making labor more efficient on the farms. This involved the encouragement of the cooperative exchange of labor among farmers, the study of wages as related to farm prices, the provision of better housing and living conditions for laborers, the use of gasoline power, labor-saving devices, and the development of a better spirit of cooperation between the farmer and the city business man in solving the annual problem of seasonal farm-labor requirements.

Active cooperation was also maintained with the War Department, particularly with the morale branch of the General Staff. In this work the office maintained representatives at 11 demobilization camps for the purpose of furnishing information regarding agricultural opportunities and particularly regarding openings for employment on farms to all returning soldiers who were interested in agriculture.

FARM EQUIPMENT.

The work done during the year with reference to farm equipment has been largely concerned with the use of power machinery and with the relations between mechanical power and horse power. Three new studies were made:

1. A study of the displacement of horses by tractors and the cost of operating tractors on about 200 corn-belt farms was made during the summer of 1918.
2. A preliminary economic study of the use of motor trucks on farms was made in sections around Kansas City, Omaha, and Indianapolis, with the intention of obtaining, as soon as possible, detailed information on motor-truck operations from a large number of farms in all parts of the country.
3. A study of the duty of farm implements and crews and the costs of using farm implements in central Illinois.

REPORT OF THE CHIEF OF THE WEATHER BUREAU.

G. F. MARVIN, *Chief of Bureau.*

POST-WAR CONDITIONS.

With the close of the fiscal year and the passing of war conditions the Weather Bureau finds itself face to face with post-war conditions of more serious character even than the difficulties imposed by the

war. It seems appropriate at this time to state briefly the status and functions of the Weather Bureau because applied meteorology ~~as~~ never before in history has come to be recognized as a highly important factor and guide in the conduct of almost every activity of any consequence of the Nation. Never before in any previous war did the science of meteorology play any important part or have a place in the program of military and naval organizations and operations. Now it is regarded as indispensable and is destined to become a permanent feature of each arm of the service.

Created in 1870 as a part of the Signal Corps of the United States Army by a joint resolution of Congress "to provide for taking meteorological observations at the military stations in the interior of the continent and at other points in the States and Territories of the United States and for giving notice on the northern lakes and on the seacoast, by magnetic telegraph and marine signals, of the approach and force of storms," its network of stations soon embraced the entire United States.

Subsequently the designation of the service was changed to the Weather Bureau, which, by act of Congress approved October 1, 1890, was transferred from the War Department to the Department of Agriculture and its duties and functions defined in the following language:

The Chief of the Weather Bureau, under the direction of the Secretary of Agriculture, shall have charge of forecasting the weather; the issue of storm warnings; the display of weather and flood signals for the benefit of agriculture, commerce, and navigation; the gaging and reporting of rivers; the maintenance and operation of seacoast telegraph lines and the collection and transmission of marine intelligence for the benefit of commerce and navigation; the reporting of temperature and rainfall conditions for the cotton interests; the display of frost, cold-wave, and other signals; the distribution of meteorological information in the interest of agriculture and commerce; and the taking of such meteorological observations as may be necessary to establish and record the climatic conditions of the United States, or are essential for the proper execution of the foregoing duties.

This organic act, with interpretations and extensions by subsequent annual appropriations, assigns to the Weather Bureau the entire domain of meteorology, including the duty of preparation and issue of forecasts and warnings of weather, storms, cold waves, heavy snows, floods, and the stages of rivers, all in the interest of commerce, agriculture, and navigation. At present it maintains over 200 fully equipped meteorological stations, and about 1,400 substations classified as special meteorological, river, storm-warning, hurricane, marine, cotton-region, corn-and-wheat-region, fruit, cranberry, and fire-weather warning stations. In addition to these the Bureau maintains, in connection with its climatological work, about 4,500 stations known as cooperative stations, the equipment being furnished by the Bureau and the observations being taken by public-spirited citizens who render gratuitous service. Its cooperative work extends to practically every ocean of the globe, and the masters of many vessels (the number was greatly reduced by the war, but is now on the increase) fill out our forms of daily meteorological observations on every voyage, to be forwarded on arrival in port. Before the war daily observations received by cable and otherwise from selected stations over the entire Northern Hemisphere were collected and published. Negotiations to restore this exchange are under way. A highly

trained, efficient, and experienced personnel of over 800 commissioned employees, helped by about 1,400 who receive a small compensation for the regular performance of specific duties, conducts the work of the Bureau, and in addition the marine and cooperative observers constitute a host of nearly 6,000 public-spirited individuals who serve gratuitously. Such, in brief, is the machinery and organization of the Weather Bureau.

While the Bureau is best known to the public through the issue of its daily forecasts, maps, and bulletins, there is no doubt that its greatest value in an economic sense consists in the immense saving effected by its special warnings, as of storms and hurricanes for the benefit of marine interests, warnings of floods that occur on the principal rivers, warnings of cold waves which accomplish protection to property and food stuffs liable to damage by injuriously low temperatures, and warnings of frost and freezing weather for the benefit of the fruit, sugar, tobacco, cranberry, market gardening, and other interests.

Its duties and authorities by law are broad and comprehensive, and post-war conditions bring it new and important obligations and responsibilities which it is fully alert to recognize and eager to discharge. With the experience and traditions of nearly 50 years to its credit, the Bureau is in a position to render practically every service of a meteorological nature which may be required of such an agency and at an economy of expenditure of public funds which can not be surpassed, or even equaled, by any new agency.

A few only of the post-war problems and demands in the administration of the affairs of the Weather Bureau will be mentioned here.

METEOROLOGY AND AERONAUTICS.

From a phenomenal development under the stimulus of war necessities the navigation of the air is rapidly extending to its civil and commercial or industrial stage. Flying in ignorance or disregard of meteorological conditions and warnings is at times suicidal and destructive of costly property. Even before flying increased so greatly within the United States the Weather Bureau inaugurated a service of flying forecasts, effective December 1, 1918, which is conducted in cooperation with the Chief Signal Officer of the Army and for the benefit at first of the Army training posts and the aerial mail service of the Post Office Department, and later destined to be extended to all flying in general. Much development work is needed to make this service the most effective possible, all of which may be accomplished, as flying develops, through existing agencies and channels of co-operation between the public and the branches of the Government concerned.

METEOROLOGY FOR MILITARY OPERATIONS.

Closely allied to meteorology for aeronautics, the experiences of the war have created a demand for a service to supply information for artillery, gas warfare, and other kinds of military operations, each in its way different. The influence of winds upon the flight of projectiles has long been recognized, but in the past methods of observing the actual motions of the free air in the various altitudes were little known and less used, consequently the allowance for wind in the older formulæ of the artillerists were largely academic or mere

approximations, whereas nowadays the ballistic wind is not a matter of guess or estimation, but of definite and direct observations by meteorologists employed for the purpose and using pilot-balloons or other aerial apparatus which meteorologists have developed and employed in the advancement of their own science.

On a peace-time basis these needs are being met by cooperative work and arrangements existing between the Chief of the Weather Bureau and the Chief Signal Officer of the Army, as a result of which a limited number of stations are maintained by the Army, while others constituting a useful coordination of points are established and maintained by the Weather Bureau. Observations at these stations consist chiefly of the flight of small rubber pilot-balloons. The results are used locally as required and telegraphed to the central office of the Weather Bureau for the use of the official forecasters in the issue of flying advices and other information.

MARINE METEOROLOGICAL OBSERVATIONS.

The submarine menace brought on with the war soon terminated the program of observations which merchant vessels plying the several oceans of the globe were long accustomed to furnish with the object of supplying data and information concerning the climate and meteorology of the oceans for publication as aids to navigation (marine) on the pilot charts of the Hydrographic Office. This service is being restored gradually, and its importance is enhanced on account of the policy of extending the merchant marine of the United States, and also extensive navigation of the air over the oceans, which the future is sure to see accomplished.

Details of the major activities and work of the Bureau follow:

FORECAST SERVICE.

The general forecast service continued in operation as in the past several years. This plan consists of: (a) The Supervising Forecaster at the central office, Washington, D. C., who has general charge of the forecast work of the Weather Bureau and regularly makes the day-to-day forecasts and special warnings for the Washington forecast district and warnings of storms and dangerous winds for the Great Lakes, the Atlantic and Gulf coasts, and the West Indian waters; (b) district forecasters at the Chicago, New Orleans, Denver, and San Francisco forecast district centers, who have to do with the preparation and dissemination of forecasts and warnings for their respective districts; (c) a district forecaster at San Juan, P. R., who has charge of the issue of forecasts and warnings for that part of the West Indies lying east of longitude 70° west; (d) a district forecaster at Juneau, Alaska, who issues daily forecasts for the Juneau district of southeastern Alaska throughout the year, and for the lower Tanana Valley during the period of low temperatures; and (e) local forecast officials located in many cities of importance who prepare forecasts of weather, temperature, and wind for their respective limited regions. The forecast districts with headquarters at San Juan and Juneau were organized during the fiscal year ended June 30, 1919; otherwise there was no change in the general plan of organization.

FORECAST OFFICIALS.

The officials assigned to forecast service are selected only after long preliminary training and through competitive tests that extend through one or more years. It is necessary that the officials engaged in this work have a fundamental training in the laws of atmospherics and also that they be temperamentally fitted for the work, which, at times, is extremely arduous and requires the constant attention of the one engaged therein. In addition to the officials that are actually engaged on this work, there are of the younger men of the Bureau approximately 40 who engage in what is termed "practice forecasting," fitting themselves to later become local forecasters and yet later, in the event of special aptitude and success, to become assistants to district forecasters. This system of training forecasters must necessarily rest in the Weather Bureau, for there is no outside institution of learning where one might perfect himself in the art of weather forecasting.

FORECASTS AND WARNINGS.

The forecasts that are regularly issued by the Bureau are adapted to the many varied demands for them. In general, they consist of the following:

(a) Day-to-day forecasts, for 36 to 48 hours in advance, of the general weather, temperature, and wind conditions for the various State units. These forecasts are issued twice each day, a. m. and p. m., at approximately 9:30 o'clock. The morning forecast is given general distribution through the display of weather and temperature flags, the telephone, printed cards and bulletins, and the afternoon press; the evening forecast is distributed mainly through the various press associations for appearance in the morning press.

(b) Weekly forecasts, that are issued Saturday of each week for larger areas than the day-to-day forecasts, and set forth the expected general conditions of the weather for that period in advance. These forecasts are disseminated largely through the press, but also through mailed cards and bulletins.

(c) Local forecasts, that are issued daily by the officials of the more important Weather Bureau stations for their respective regions. These include a statement as to the probable weather, temperature, and wind, and, during the winter months, the probable minimum temperature is made a part of the forecast.

(d) Shippers' forecasts, which are regularly made during the months when temperatures likely to be injurious to shipments of perishable goods and produce occur. These forecasts are prepared and issued by the local forecasters at many of the regular Weather Bureau stations.

(e) Special forecasts that are issued from time to time as occasion requires, and some of these are given special designations, as, for example: "Fire-weather warnings," for the forest regions of the West; "Orchard forecasts," for the guidance of spraying operations for insect pests and fungi, and of heating operations to prevent frost injury. Moreover, special forecasts are regularly issued for the cranberry industry of Massachusetts, New Jersey, and Wisconsin; and for various other industries that are partially or wholly dependent on accurate forecasts of weather and temperature changes.

(f) Day-to-day forecasts of the weather and winds along the trans-Atlantic steamship lanes eastward from the Atlantic ports to the Grand Banks of Newfoundland are issued for the guidance of vessel masters.

(g) Day-to-day wind and weather forecasts for the Atlantic and Gulf coasts are issued each day and transmitted to vessels at sea through naval radio. In addition to the forecast there is included in this daily message the prevailing weather and wind conditions at ports along the Atlantic and Gulf coasts and a statement as to the position of any atmospheric disturbance and its direction and speed of movement and intensity.

(h) Aviation forecasts are made regularly each day for the Post Office Department and the United States Army Air Service and the United States Naval Air Service. This service is conducted in a rather limited way as yet, but the general plan of the Weather Bureau aims to effect its development as rapidly as funds and the extension of aviation justify.

(i) Warnings are obviously issued only at specified times, but many of them are so important that when conditions arise which require their issue other lines of work give way in order that the warnings and advices may be placed before commercial and other organizations that may be benefited thereby. Warnings are issued for cold waves, heavy snows, gales, frosts, local storms, floods, winds dangerous to navigation on the Great Lakes, the oceans, the Gulf of Mexico, and the Caribbean Sea, and for hurricanes. There can be no question but that this service saves many lives, and that property to the value of millions of dollars has been protected and saved through the prompt issue of these warnings by the Weather Bureau.

FUTURE DEMANDS.

With the wider recognition now accorded applied meteorology, increased demands are being made for information and forecasts. Advices of various kinds and forecasts are already being supplied the Air Services of the Army and the Navy and the Post Office Department, and it seems altogether probable that the growing demands for information and forecasts of a meteorological character will soon make necessary a new branch of forecasting planned to care primarily for the interests of aerial navigation.

RECENT EXAMPLES.

During 1919 there were two notable cases of the importance of accurate meteorological information and forecasts in connection with aerial navigation. The one was that of the trans-Atlantic seaplane flight by the United States Navy in May, and the other that of the visit of the British dirigible, the R-34, to our country during July. In both these instances the fullest cooperation on the part of the Weather Bureau was requested by the United States Navy. Complete synoptic meteorological reports were placed at the disposal of the officials of the Navy, and in addition the forecaster on duty prepared and issued forecasts based on the 8 a. m. and 8 p. m. regular observations for the commanding officers of these operations.

THE TRANS-ATLANTIC SEAPLANE FLIGHT IN MAY, 1919.

The start of the trans-Atlantic seaplane flight (United States Navy) was made from Rockaway the morning of May 8, two of the planes, the NC-1 and NC-3, reaching their destination, Halifax, the afternoon of the same day. The NC-4 developed engine trouble and put into Chatham, Mass. The forecast issued the morning of the 8th was as follows: "Moderate northwest and west winds. Fair weather to-day. Friday; fresh north to east winds, cloudy weather with rain over southern half of course." The evening of the 9th the following forecast was made for the seaplanes between Halifax and Trepassey Bay, Newfoundland: "Weather favorable for flight Saturday. Gentle variable winds. Fair weather. Wind velocity less than 15 miles an hour." The morning of the 10th the forecast for the same course read: "Fair weather Halifax to Newfoundland. Gentle variable winds, except moderate west and northwest off south coast of Newfoundland." The flight from Halifax to Trepassey Bay was made on the 10th and the two seaplanes making it reached their destination the afternoon of the same day. In the meantime the seaplane NC-4, at Chatham, Mass., had made ready for a renewal of the flight to Halifax, but it was held there for several days because of adverse wind and weather conditions. On the evening of the 13th the following forecast was sent the commander of the seaplane NC-4 at Chatham, Mass.: "Conditions favorable for start from Chatham for Halifax Wednesday morning (the 14th). Moderate to fresh westerly winds and fair weather." The flight was made to Halifax on the 14th under favorable conditions, and from Halifax to Trepassey Bay on the 15th, the advices sent to the commander of the NC-4 assuring him of favorable wind and weather conditions. On the 15th (Thursday) the following forecast was sent to the commander of the seaplanes at Trepassey Bay, Newfoundland: "Wind and weather conditions over the course (Newfoundland to the Azores) will improve during Friday and Saturday. Wind will be west and fresh and possibly strong. Weather will be fair. Above based on incomplete reports from the ocean. Advise start by Friday night." On Friday the following forecast was sent: "Surface winds fresh and possibly strong west-southwest and upper winds fresh to strong west over course between Newfoundland and the Azores; some clouds, fair visibility, and rising pressure. Conditions favorable for start." The seaplanes left Trepassey Bay the afternoon of the same day for the Azores. The NC-4 reached the Azores the late forenoon of the following day, while the NC-1 and the NC-3 landed in the vicinity of the Azores, but were unable to rise from the water and resume their flights

THE VISIT OF THE BRITISH DIRIGIBLE, THE R-34, JULY, 1919.

The Weather Bureau was called on for detailed information and forecasts before, during, and after the visit of the R-34 to the United States in July, 1919. The first call for information and forecasts was from the R-34 by radio when she was in the vicinity of Newfoundland, and then and after, until she had reached midocean on her return to Great Britain, the latest meteorological information and forecasts were always at the disposal of the commander of this craft. The following letter, addressed to the Chief of the Weather Bureau,

was received from the Secretary of the Navy concerning the work of the Weather Bureau in connection with the visit of the R-34 to our country:

The work done by the Weather Bureau before, during, and after the visit of the British dirigible R-34 has been keenly appreciated by the Navy Department, and by the British officers connected with this flight. The reports were most reliable and the last report sent by Maj. Bowie on the evening of July 10, undoubtedly was the prime agent in the safe departing of the ship.

Also there was received the following letter from the British air attaché in appreciation of the work of the Weather Bureau in connection with the flight of the R-34:

Permit me to thank you, on behalf of the Air Ministry for the very distinguished part you played in the success which attended the visit of the R-34. It is claimed that meteorology is the handmaiden of aeronautics, but I think that does not show the science enough respect. At any rate, you, by your assiduous attention to, and reading of, the weather during the visit contributed more than a fair share to the success attained.

TROPICAL STORMS.

Only one tropical storm of sufficient importance to justify the display of hurricane warnings occurred during the year, namely, that of August 1-6, 1918. This storm moved northwestward across the Caribbean Sea and Gulf of Mexico, and struck the Louisiana coast about 30 miles east of the mouth of the Sabine River, moving thence inward about 80 miles to northwestern Louisiana, where it was dissipated. It passed over Lake Charles and Gerstner Field, La., developing considerable violence, the wind attaining a velocity of about 100 miles an hour. Thirty-four deaths were reported as being due to the storm and the number of persons injured as more than twice that number. The damage to property was roughly estimated at \$5,000,000. Hurricane warnings in advance of the storm were ordered for the Louisiana and Texas coasts from Galveston east.

SPECIAL METEOROLOGICAL STATIONS.

As an aid to the forecast service in Alaska arrangements were made for the establishment of three special meteorological stations at Atka, Akiak, and Noorvik, Alaska, to report twice daily by radio.

HIGHWAYS WEATHER SERVICE.

A new project, designated "Highways weather service," was formally authorized during the year. In the carrying out of this project certain central stations receive reports of the conditions of the roads in the surrounding region or over certain main highways, and publish the same on their bulletins and in the press. In cases where the stations are centers of a corn-and-wheat or cotton-region service the reports of road conditions are obtained by telegraph without additional expense by the addition of a word indicating the conditions of the road to the daily report from the substations. In other instances they are obtained by mail by means of franked postal cards furnished to persons who are willing to cooperate with the Bureau in this service. Projects were in operation during the past winter at some 15 stations in 11 States, but at all but four of these it was a winter service only and was discontinued in the spring, to be resumed the coming winter. Although still in a tentative stage the service has

great possibilities and is likely to be largely extended in the future. It has proved very popular where it has been in operation, the official in charge at one station stating that he has as many calls for road data during the day as for the weather forecasts.

RIVER AND FLOOD WARNINGS.

The flood service of the Weather Bureau functioned properly, not only as to the issue of timely notices of the coming of floods but also in the daily statement of river conditions throughout the country.

The floods of the year were largely local and much less severe than in many previous years.

During threatening conditions which obtained for a time along the Mississippi River from Keokuk, Iowa, southward to Louisiana, Mo., information was furnished that proved to be of great practical utility in the organized effort to strengthen the levees along that section of the stream.

In the drainage investigations of the department and in many private enterprises in connection with river improvements the river and flood service has contributed valuable information both to agricultural and commercial interests along the great rivers of the country.

INSPECTION OF RIVER STATIONS.

Owing to the unprecedented demand for engineers, it has not been possible to obtain from the outside persons having the necessary skill and experience to correct irregularities which invariably creep into the work of river-gaging stations unless the work is frequently inspected.

As a temporary expedient an employee of the Washington office was detailed for a part of his time to field work in connection with the installation and upkeep of river gages. It was not possible in this way, however, to care for more than the most pressing cases. A return to the prewar basis of having persons of engineering ability available at central points for service in keeping the system of river-gaging stations up to standard is urgently needed.

CHANGES IN DISTRICT CENTERS.

No new river districts were organized during the year, but the charge of the Kansas River was transferred from Kansas City, Mo., to Topeka, Kans., largely for administrative reasons.

SNOW SURVEYS IN HIGH ALTITUDES.

The activities of the Bureau in determining the depth and density of the snow cover of high altitudes in certain drainage basins of the West were naturally restricted to the most urgent and promising cases. These were the White Mountain region of Arizona draining into the Roosevelt Reservoir and on the headwaters of the Walker River of Nevada.

FORMULÆ FOR FLOOD FORECASTING.

Studies leading to the formulation of rules for forecasting floods almost wholly from the physical data of rainfall have been completed during the year for the Asheville (N. C.) district.

COOPERATION.

Progress was made on the following-named specific projects during the year:

1. The collection of rainfall measurements in the mountains of Los Angeles and San Bernardino Counties, Calif., in cooperation with the local county officials.

2. The Wagon Wheel Gap Experiment Station in cooperation with the Forest Service of the department. This important project has now run for eight years, and a mass of unique data has been collected to establish, if possible, hitherto unknown facts concerning the relations between weather conditions and stream discharge on forested watersheds. The experiment has reached its second stage, in which one of the two watersheds will be denuded of its forest and observations continued for a further period of years under the changed conditions. A detailed study of the data for the first stage of the experiment is far advanced, and the future observations are looked forward to with great interest.

STATIONS AND OBSERVATIONS.**NEW WEATHER BUREAU BUILDINGS.**

After considerable unavoidable delays due to war and unsettled business conditions, the new Weather Bureau observatory and telegraph office building at Cape Henry, Va., was completed and accepted under date of September 8, 1918. This station was fully equipped with steel towers and lanterns for storm warning displays, and a small electric light plant to provide illumination for displays, vessel-signaling, and office purposes has proved very satisfactory. The new building was erected on the Weather Bureau reservation comprising 15,000 square feet of ground on beach front at the foot of Forty-third Street, where the location is much more advantageous than that previously had for many years on the lighthouse reservation. The old building is retained for use of the assistant observers.

CHANGES AT REGULAR STATIONS.

Narragansett Pier, R. I., station discontinued August 17, 1918. Weather building and reservation placed in hands of a caretaker.

Buildings and reservation at Mount Weather, Va., also remain in possession of caretaker.

On October 1, 1918, the important meteorological city substation, Central Park, New York, in the Army Building, near Sixty-fifth Street, East, maintained continuously for about 50 years past under local supervision, was removed to, and installed in the remodeled Belvidere Tower building, near the Eighty-first Street, West, entrance to the Park, and re-equipped as a permanently established substation of the Bureau.

Completion of a Federal building at New Haven, Conn., in which accommodations were provided by the Treasury Department, enabled the Bureau to effect removal thereto February 15, 1919, and save rental heretofore paid for quarters in a private building.

Notwithstanding the general increase in rentals throughout the country during the last two or three years, it has been possible

to effect a considerable saving to the Government by reason of the 5-year renewal clause in leases whereby the Bureau was able to retain occupied quarters at prewar prices. Leases involving \$6,466 at the old rate, which now expire by limitation at seven stations where increase is demanded, required renewal at a total increased cost to the Bureau of \$1,556 for the next fiscal year, or about 24 per cent of the total amount paid for such rentals. One serious incident of exorbitant increase in rental compelled the Bureau reluctantly to move its station at Topeka, Kans., to quarters in a new rented building. The following statement shows the present status of Weather Bureau offices at field stations outside of Washington, (not including Narragansett Pier or Mount Weather):

Free quarters and accommodations:

In Observatory buildings, owned and controlled by the Weather Bureau.....	45
In State University buildings.....	5
In Federal buildings.....	72
Total free of rental.....	122
Rented buildings, etc., owned by individuals or corporations:	
In office buildings.....	80
In buildings with grounds, aerological and special meteorological stations.....	19
Total number rented buildings partly or wholly occupied.....	99
Total.....	221

TELEPHONE SERVICE.

In connection with its prompt and wide dissemination of storm warnings and general meteorological information, the Weather Bureau probably is the most extensive user of telephones of any branch of the Government, and at its more than 220 central field stations has direct wire connections with local telephone exchanges. An authorized allotment of about \$14,000 was made for this local telephone service for the fiscal year ended June 30, 1919, and the increased local rates promulgated in the Postmaster General's Order No. 2940, effective May 1, 1919, called for an almost complete readjustment, together with an added and wholly unexpected charge against our appropriations for 1918-19. For next fiscal year the total cost of this service is likely to reach \$17,000.

TELEGRAPH CONTRACTS.

For the prompt handling of meteorological reports and weather information over the greater part of the Northern Hemisphere the Weather Bureau has necessarily maintained for many years past formal annual contracts, arranged under special authority of law, with all of the more important telegraph, telephone, and submarine cable companies, including also wireless commercial companies, through cooperation with the Naval Communications Service. By order of the Postmaster General, dated June 7, 1919, Weather Bureau contracts for next fiscal year and during Federal control were made exempt from increase of rates, but this affects only contracts entered into by the central office at Washington. An opinion was also obtained that increased rates were not applicable for wire and battery service leased for maintenance of local recording river gages and similar self-registering equipment used by the Weather Bureau.

INVESTIGATIONS IN VOLCANOLOGY.

The act making appropriations for the Weather Bureau for the fiscal year ended June 30, 1919, contains authority for investigations in volcanology and appropriates \$10,000 therefor. Provision for this project was included in a supplemental estimate submitted to Congress for the fiscal year 1917, but was not allowed. The estimate was not repeated for the fiscal years 1918 and 1919, but was inserted on the initiative of Congress itself for the current fiscal year. The primary purpose of the appropriation is to conduct investigations in volcanology at Kilauea Volcano, on Hawaii Island, of the Hawaiian group, with the expectation that they may be extended later in Alaska and other places in the United States possessions where active volcanoes exist. The site of the volcano and extensive adjacent territory has recently been included in a national park.

Investigations have been conducted at Kilauea since 1912, first under the auspices of the Massachusetts Institute of Technology, and since 1913 by the Hawaiian Volcano Research Association, which is composed principally of prominent citizens of Honolulu.

The Weather Bureau took formal control of the work at Kilauea on February 15, 1919. Prof. Thomas A. Jaggar, jr., formerly of the Massachusetts Institute of Technology, who has been in charge of the investigations since their inception, has been appointed volcanologist and will continue in immediate charge.

The buildings, grounds, instruments, and equipment belonging to the Hawaiian Volcano Research Association were transferred to the control of the Weather Bureau under the terms of a long-time lease. Prof. Jaggar and his assistants will reside in the observatory buildings, and the major part of their work will be conducted at the Kilauea Volcano, although simultaneous studies of the activities of near-by volcanoes, especially Mauna Loa, will be made as far as practicable.

The program of work at present contemplates little more than the maintenance of the systematic observations of the volcano, with some possible extensions in the way of a seismic survey of the vicinity. No more than this can be undertaken with present funds, but as national affairs become more stabilized under peace-time conditions the opportunity offered here of conducting extensive investigations in the field of volcanology will no doubt be fully supported and important results secured.

AEROLOGICAL INVESTIGATIONS.

Free-air observations by means of kites were obtained throughout the year at Drexel, Nebr., and Ellendale, N. Dak. Installation of equipment was completed for similar work at Broken Arrow, Okla., Groesbeck, Tex., Leesburg, Ga., and Royal Center, Ind. Regular observations were begun at those stations before January 1, 1919. These observations, as well as those at Drexel and Ellendale, include daily kite flights and, whenever possible, continuous series of flights covering periods of 24 to 36 hours. The records have been reduced at the central office, and the results published in aerological supplements of the Monthly Weather Review. Moreover, brief summaries are telegraphed daily to the central office and other district forecast centers.

The pilot-balloon work that was organized and conducted during the war by the meteorological section of the Signal Corps at Broken

Arrow, Okla., Ellendale, N. Dak., Groesbeck, Tex., Leesburg, Ga., Royal Center, Ind., and Washington, D. C., was transferred to the Weather Bureau during the latter half of the year. Similar work has been organized at regular Weather Bureau stations at Ithaca, N. Y., Lansing, Mich., and Madison, Wis. Observations are made twice daily, and the indicated wind conditions at various heights are telegraphed to the central office for use in furnishing advices to the military, naval, and postal aviation services. The Weather Bureau observations are supplemented by similar reports from several military and naval air stations where work with pilot balloons is regularly conducted. All of the free-air records thus obtained are furnished to the central office for final reduction and study.

Both during and after the war there was close cooperation with the Army and Navy meteorological services. Special data were furnished also to the ordnance departments and to the military intelligence and aviation services. Advices were given to the United States Navy in connection with its trans-Atlantic flight project, further details of which are stated under the section on forecast service.

TELEGRAPH SERVICE.

The prompt collection and dissemination of weather reports and warnings require an extensive network and use of commercial telegraphic facilities. Various elements of a disturbing nature contributed generally, and in some phases in an aggravated form, to a continuance of the difficulties experienced during the preceding year in maintaining the telegraphic circuits at a high standard of efficiency, although some improvement was noted during the last half of the year. Chief among the causes were shortage of experienced operators in the commercial companies, necessary employment of untrained forces, substitution of machine for manual transmission of telegrams over trunk lines, the epidemic of influenza, abridgment of the hours of labor, late opening of telegraph offices at numerous small but important points, preventing dispatch of observations at usual times, and, latterly, the prevalence of minor strike conditions.

Effectual means were promptly taken by the commercial companies as a rule, however, to remedy unsatisfactory conditions upon presentation of complaints, and, on the whole, the telegraph service was performed as efficiently as could have been expected.

Changes in telephonic rates, effective January 21, and in telegraphic rates, effective April 1, imposed additional difficulties in examination and passage of accounts for service, necessitating a large volume of correspondence to effect proper adjustment.

A complete revision of forms showing distribution of forecast messages throughout the country, approximately 1,100 daily, was accomplished, resulting in much improved record lists.

During May and June a large number of telegrams was handled in connection with the trans-Atlantic flights in which the Weather Bureau cooperated with the Navy Department, additional telegraphic loops having been installed for the purpose. As this business was filed during the rush hours of the morning and evening, its handling, coupled with the other routine work, taxed the operating facilities to the utmost.

The services of another clerk-operator are much needed to properly handle the telegraphic and auditing work throughout the crop and hurricane seasons, and the need is much accentuated at times of increased work similar to the above. Should there be further increases of telegraphic work consequent upon the contemplated extensive cooperation with the Army and Navy, a corresponding enlargement of the telegraphic force will become imperative.

WORK IN CLIMATOLOGY.

No important changes occurred during the year in the work in climatology, and the several important lines were carried forward as usual, despite many general enlargements in most of the items making up the duties and some decrease in the clerical force available.

All material prepared for the several publications of the Bureau was submitted as per schedule and the final reports printed at the time designated. The weather data for the Monthly Weather Review, Annual Report of the Chief of Bureau, and the monthly and annual climatological reports for the several States were subjected to the usual careful scrutiny, and effort has been made to maintain the standard of accuracy heretofore required, although, as stated above, there has been a steadily increasing number of reports to be examined and a constant diminution of the effective working capacity of the clerical force.

COOPERATIVE REPORTS.

The work of the cooperative observers of the Bureau has been maintained in a highly satisfactory manner despite the additional duties imposed on the observing force by the unsettled world conditions and the lessened opportunities for such work in view of the shortage of labor in general.

More changes in the observing force were necessary than usual, owing to a large shifting from the usual lines of work to those pertaining to the war, but the continuity of the work was usually provided for and the records as a whole were remarkably complete, and continued improvement in practically all features of the work was noted.

INSPECTION OF STATIONS.

The policy of inspecting cooperative stations once in each three years, temporarily suspended during the early portion of the fiscal year just closed, was vigorously taken up toward the latter part and is being continued whenever feasible for officials to absent themselves from their stations. These visits of inspection impress the cooperative observers with an added sense of the importance of their work, establish a spirit of sympathetic cooperation, and encourage them to renewed effort in case they have become discouraged at the prospective amount of work without financial remuneration or an apparent lack of appreciation by the Bureau or the public of the value of the records they are at such pains to make.

During the year most cordial cooperation was maintained with other Government bureaus in collecting meteorological reports from points that would naturally be without representation but for the willingness of the officials to take up this special duty in addition to their regular lines of work.

OCEAN METEOROLOGY.

As was pointed out in previous reports, the work of the marine section was seriously interfered with by the war, the loss of reporting vessels and censorship restrictions together having the effect of greatly reducing the number of reports available for charting and study. So far as possible, however, the work of the section proceeds along the usual lines.

Upon the close of the war attention was centered upon a program for the restoration and extension of the marine work, and plans have been formulated which will result in a material advancement of our knowledge respecting meteorological conditions of the great ocean areas.

Progress in this direction is necessary to enable the Bureau to meet the increasing demands for information regarding weather conditions over the oceans resulting from the expansion of our merchant marine and commercial development associated therewith, as well as those arising from experiments in trans-oceanic flight.

MISCELLANEOUS ITEMS OF WORK.

The usual work incident to the receipt, examination and filing of the meteorological reports of the Bureau went forward as usual. The section publications were assembled and prepared for distribution and the sets of these intended for station files for the year 1918 were bound and distributed. The binding of the original records of the preceding year was accomplished as usual and all reports put in shape for permanent preservation. The tabular matter usually extracted from the original records has been entered in the books prepared for such data and all are as nearly up to date as it is practicable to keep them.

Many data on the temperatures of the country have been accumulated during the year, particularly with regard to the maximum and minimum values. Extensive compilations of the daily and weekly means of these factors for the 40-year period ending with 1918, have been obtained from the various stations. It is hoped opportunity will be afforded during the present year to properly analyze and interpret these data and present them to the public.

Near the close of the year steps were taken to present to the public in general, but particularly for the benefit of the engineering professions, through the press, more information on the daily state of the moisture in the atmosphere, and at this writing these data are being published for the three principal observations in practically all the leading papers in the country. At the same time a revision of the local station forms intended for public distribution was being considered by which similar data will be presented to the public in much greater detail than heretofore.

The extensive utilization of our accumulated records by nearly every class of our population has continued during the year, and the fact that practically every request for information has been promptly and fully met indicates the extensive character of the data we are collecting. The reputation of the Bureau for prompt service has been fully maintained, as indicated by the many acknowledgments of appreciation received for early and complete responses to requests for information.

AGRICULTURAL METEOROLOGY.

The activities under this section include the supervision of special services maintained in the interests of agriculture in the principal grain, cotton, sugar, rice, alfalfa seed, cranberry, tomato, tobacco, fruit, and potato-growing districts, as well as in the great grazing districts for the benefit of those interested in stock production; all maintained for the collection and dissemination of information relative to current weather conditions throughout the country, and their resulting effects upon the development of crops and the progress of agricultural operations.

In addition to the above, studies are conducted on the influence of weather on the development of crops, and the relation of weather and climate to agricultural activities and crop yields, including the supervision and distribution of forecasts of minimum temperatures during critical periods in districts where protective methods are extensively practiced. The fruit frost-work was very successful during the year, particularly in the Northwestern States, and gratifying progress was made during the year in studies of special mathematical methods of forecasting minimum temperatures that may be injurious to fruit.

Weather is a dominant factor in the success or failure of agricultural or horticultural operations, and special effort was made during the year to apply the information collected, through the vast organization of special and cooperative services of the Weather Bureau, to the important problem of food production in its various aspects.

SPECIAL SERVICES.

Few changes were made during the year in the special crop services maintained by the Bureau and described sufficiently in the last annual report. The cotton, corn, and wheat services were improved during the year by the inauguration of a new system of making observations whereby the minimum temperatures experienced during the preceding night were reported instead of the 24-hour minimum.

A new method of issuing reports weekly, instead of daily, in the cattle region service, has proved very satisfactory, and resulted in a material reduction of expense. There is an insistent public demand for the extension of this service over some important grazing districts not yet covered, which it is hoped to meet in the near future.

Special studies were made during the year in the development of a mathematical hygrometric formula to aid in making more accurate minimum temperature forecasts.

The special forecast and warning service was extended, with good results, in connection with spraying operations in some important fruit growing districts. So far as the depleted personnel of the bureau would permit, trained officials of the Weather Bureau were detailed to special field duty in fruit districts during critical periods for the purpose of giving advice as to the best time to conduct spraying operations. It is hoped that, when more normal conditions prevail, the Bureau may be in position to enlarge and improve this branch of its activity.

Cooperation.—By request of other departments of the Government, and for the use of the recent Peace Conference at Paris, the Weather Bureau prepared, during the fall and early winter, a general summary of the climate of Africa, with special attention to that of the

former German colonies. A vast amount of climatic data was compiled, and a number of charts were prepared showing graphically the annual and monthly distribution of precipitation and temperature over the continent, together with a discussion of its climatic characteristics.

The Weather Bureau continued its cooperation with other bureaus of the department in maintaining special meteorological stations at various points in different sections of the country as an aid to research and investigation of the many agricultural problems in which weather is an important factor.

INSTRUMENTATION.

The instrumental equipment of the various stations of the Bureau has been maintained at the high standard of former years. The practical cessation of European supply and the difficulties attending American manufacture of instruments have made it less simple than heretofore to obtain suitable supplies, particularly when such supplies involved the labor of highly skilled artisans. Prices of instruments and of parts have increased greatly, and we have been able to maintain the equipment of the Bureau with the appropriation available only by working over a considerable stock of apparatus available. The instrument shop of the Bureau has been availed of to salvage instruments that under ordinary conditions would hardly be worth repair. Naturally a time will soon come when further operations of this character will not be possible, and, unless prices recede, a substantial increase in the allotment for instrumental equipment must follow.

STORM-WARNING EQUIPMENT.

The three-lantern system was completed on the Atlantic coast during the fall of 1918, and work on the Pacific coast was about half completed at the end of the fiscal year. The entire installation will be finished by October 1, 1919. It is a pleasure to report that there has been very little expense for repairs at stations equipped with this new system, and while the initial expenditure of making the change is somewhat high, it is believed that the total cost to the Bureau through a period of, say, 10 years will be no greater than would be the cost of maintaining the former less effective equipment.

INVESTIGATIONS IN SOLAR RADIATION.

The necessity of employing untrained observers led to the suspension of radiation measurements at Santa Fe, N. Mex., between September 12, 1918, and April 23, 1919, and to a marked reduction in the number of measurements at Lincoln, Nebr., during July and August, 1918. By the end of April, 1919, measurements were being obtained as heretofore at both these stations, and also at Madison, Wis., and Washington, D. C.

The assignment of the official in charge of solar-radiation investigations to the editorship of the Monthly Weather Review greatly curtailed his opportunity for research work. However, apparatus was tested and an observer trained in its use for the measurement of nocturnal radiation in orchards at Pomona, Calif., and at Medford, Oreg., in connection with the frost-protection investigations of the Weather Bureau. Measurements were also made of the rate at which heat is radiated from different types of oil heaters employed in orchard heating.

At the end of the fiscal year the work of computing from the radiation measurements available the diurnal and annual variations in radiation intensity with geographical position in the United States, and those which depend principally upon latitude, altitude, and the vapor content of the atmosphere, was well advanced. One of the by-products of the computation has been the determination of the relation between radiation intensity, expressed as a percentage of clear-sky intensity, and the percentage of cloudiness and of the possible hours of sunshine, as observed by eye and recorded automatically, respectively, at most Weather Bureau stations. The results of the computation, which will be shown graphically, will soon be ready for publication.

From the relation between the sun's total, or heat radiation, and the luminous solar radiation, heretofore determined, charts and tables are also being prepared showing the intensity of direct solar illumination on a surface normal to the solar rays, on a horizontal surface, and on vertical surfaces in the plane of the meridian and the prime vertical, respectively, and also the intensity of diffuse sky illumination on a horizontal surface. The illumination data are furnished in response to repeated and urgent requests from illuminating engineers and architects, and must be considered preliminary in their character, as the investigation has disclosed the need of extensions in the observational work, especially on the Pacific and Gulf coasts and in the northern tier of States.

INVESTIGATIONS IN SEISMOLOGY.

The important work of collecting and publishing earthquake data, begun December 1, 1914, has been continued during the year. These data are of two kinds, noninstrumental reports of earthquakes felt and instrumental records, often of quakes imperceptible to the senses and even originating at a great distance. The noninstrumental reports are rendered by all the regular stations of the Bureau, nearly 200 in number, and also by nearly all the Bureau's 4,500 cooperative observers. The instrumental records published by the Bureau have been obtained in part by instruments owned and operated by the Bureau itself, one at Washington, D. C.; one at Northfield, Vt.; and one at Chicago, Ill., and partly through the cooperation of a number of additional stations distributed from Panama to Alaska and from the Hawaiian Islands to Porto Rico.

During the calendar year 1918, 127 separate earthquakes strong enough to be felt were reported from different parts of the continental United States. The great majority of these did no damage whatever; a few, however, were strong to severe. One of these, occurring on April 21, destroyed the business sections of Hemet and San Jacinto, in southern California. An equally severe quake occurred on May 28 in New Mexico, but did very little damage.

The chief earthquake damage in our outlying possessions occurred in Porto Rico on October 11 and 12. The records of this series of quakes obtained at Washington and Chicago were used by the commission especially delegated to study these disturbances.

In addition to the above regular work certain studies of meteorological phenomena have been made and several brief papers published.

ANNUAL REPORT OF THE SECRETARY OF COMMERCE.

DEPARTMENT OF COMMERCE.

OFFICE OF THE SECRETARY,

Washington, October 30, 1919.

To the PRESIDENT:

I have the honor to submit herewith my seventh annual report, covering the operations and condition of the Department during the fiscal year which ended June 30, 1919, and tracing in a general way its operations to October 1 of the present year.

Recommendations have hitherto been often made respecting the inadequate subsistence allowance for Department employees when traveling. Force is added to these by present prices. It has always been wrong to require Government officers when traveling to pay out of their own pockets part of the cost of the public work they do. The situation is worse to-day. This injustice can not be too speedily corrected, either by increasing the subsistence allowances or by authorizing some flexibility in the matter under the direction of the Secretary.

It has been heretofore pointed out that the Bureau of Standards may and does send its representatives to meetings and conventions at public expense. The law especially permits this. It does not, however, grant a like privilege to the representatives of the Coast and Geodetic Survey, the Bureau of Fisheries, the Bureau of the Census, and other services. The same obligation and usefulness exists as regards this matter in connection with the work of all services. There is no reason why one bureau should be preferred to others. The privilege should be extended to all alike.

Your attention is particularly asked to Appendix B, giving in detail the record of the efforts of the Bureau of Fisheries to introduce new foods, in connection with statements that have been made in Congress respecting this work. The successful work of

this service in developing the use of existing aquatic foods and in introducing new ones has been stopped because one part of its work was confused with another part which has no relation to the matter. It has been thought best, therefore, to make the whole record clear in this report.

American-Canadian Fisheries Conference.

The appointment of the American-Canadian Fisheries Conference and its general purpose were referred to in my annual report for last year (p. 7).

Some of the questions that came before the conference are as old as the American Republic, others are of comparatively recent origin; and they differ greatly in national and international importance. Some of the questions were satisfactorily disposed of by executive action of the two countries, some can be settled only by treaty and others by legislation, and at least one was left for fuller consideration at a more auspicious time.

During the course of the inquiries conducted, action was taken as follows in the settlement of pending questions, or as affecting the fishery relations of the two countries:

1. The Canadian Government, by order in council, prohibited net fishing in Lake Champlain and thus gave to fish in the Quebec portion of the lake the same protection that was already afforded in New York and Vermont.

2. The Canadian Government, by order in council, modified the provisions of the *modus vivendi* so as to accord fuller facilities to American fishing vessels using Canadian ports and harbors.

3. The United States Government, by order of the Department of Commerce, permitted Canadian fishing vessels (and the fishing vessels of other nations acting with the United States in the prosecution of the war) to enter United States ports from the fishing grounds and clear for the high seas, this authority, however, like that granted by the Canadian Government in extension of the *modus vivendi*, being a war measure.

4. The United States Government, by order of the Department of Commerce, removed discriminatory navigational regulations applying to Canadian fishing vessels passing through the territorial waters of Alaska to and from the fishing grounds on the high seas.

A treaty covering the subject of reciprocal port privileges for the fishing vessels of the United States and Canada is pending.

Legislation is before Congress to restrict the use of lobster well-smacks by citizens of the United States in waters off the Canadian coast when there is a close time on lobster fishing in Canada, but no affirmative action has been taken on the measure.

Recommendations have been made to the respective Governments in regard to the protection of the Pacific halibut and the protection of sturgeons, and action thereon is pending. The international protection of whales, which the conference regarded as deserving careful attention, was recommended for consideration at a later date.

The protection and rehabilitation of the sockeye salmon fisheries in the contiguous waters of the State of Washington and the Province of British Columbia, perhaps the most important subject considered by the conference, was covered by a comprehensive system of regulations recommended for the adoption of the two countries. A treaty covering this subject was signed by the representatives of Great Britain, Canada, and the United States on September 2, 1919.

Vessels of the Department's Marine Services.

The steamer *Surveyor*, the only vessel especially designed and constructed for the work of the Coast and Geodetic Survey, went into the Navy a month after completion. The ship returned to the Survey with the honor of having assisted in disabling, on May 17, 1918, the German submarine *U-39*, which sank the *Lusitania*. She is now at her post of duty in Alaska and there provides for the first time a vessel adequate to the vast and difficult work of surveying those dangerous waters, the scene of so many disastrous wrecks. The *Surveyor* alone, indeed, is not sufficient for the task of covering the 26,000 miles of coast to be surveyed in Alaska. She will be assisted by other vessels which the Navy has turned over for that purpose, namely, the *Sialia*, the *Natoma*, and the *Wenonah*. Even with this equipment, now for the first time available, it will be long years before the waters of Alaska will be so well charted that they can be traversed in all parts with confidence. Great as the development of Alaska has been, it has been held back, as every navigator of those waters knows, by the failure of the country heretofore to visualize the size of the task of surveying its shores. We have waited until a sad series of wrecks, with their accompanying losses of life and property, have shocked us into activity in work which should have been adequately undertaken decades ago.

For the first time launches designed and built for the special duty have been provided for the wire-drag work of this service, and with these and two others which the Navy Department turned over to us under your Executive order of May 24, 1919, we are now able to carry on this important work in Alaska with more effectiveness. It is strange that in order to do a great duty of peace we should have to depend upon supplies assembled for war. It does not reflect credit upon our judgment and foresight that this should be so, but it is well to be thankful for what we have without worrying as to the way in which it came. The fact is that the Coast and Geodetic Survey has some vessels for service and a few launches for wire-drag work and that if sufficient funds are provided for their use and for the necessary field and office forces and equipment, the service is in a position to give assurance to our commerce and navigation of safety in all our waters such as it never had before.

On July 1, 1919, the Navy Department returned to the Bureau of Lighthouses 47 lighthouse tenders and 4 light vessels, transferred to that department for war uses by your Executive order of April 11, 1917. This Service has also acquired two small vessels (*Cosmos* and *Poinsettia*) from the Navy Department and during the year built two small tenders (*Elm* and *Pine*). Six lighthouse vessels have recently been lost: Diamond Shoal Light Vessel No. 71 was sunk by enemy submarine on August 6, 1918; Cross Rip Light Vessel No. 6 was destroyed by the ice in February, 1918; while in the shipyard awaiting repairs necessitated by damages from ice, the 35 Foot Channel Light Vessel No. 45 was burned on March 3, 1918; Relief Light Vessel No. 51 was sunk on Cornfield Point light vessel station by Standard Oil Co.'s barge on April 24, 1919; the tender *Gardenia*, after 40 years of valuable service, was condemned on March 1, 1917, as was Bush Bluff Light Vessel No. 97 on October 23, 1918, after 43 years of service.

The commandant of the fifth naval district, in his formal letter of June 30, 1919, returning some vessels of the Lighthouse Service to this Department, says:

The district commandant wishes to use this opportunity to express his high appreciation of the cordial cooperation of the Lighthouse Service in the solution of many problems arising during the period when they were under Navy control. The Lighthouse Service has responded quickly and efficiently to every demand made upon them by the naval district. The services of the lighthouse vessels were of immense value in the laying of submarine-defense nets and, after the armistice, in removing those nets. This was a task which would hardly be possible of accomplishment without the assistance of the lighthouse vessels.

The Navy Department has also turned over to the Bureau of Fisheries four scout patrol boats, two of which will be used as patrol boats in southeastern Alaskan waters and two for fish-cultural work. Four vessels, loaned by this bureau to the Navy Department during the war, have been returned. The *Roosevelt* was condemned and sold in early July of this year. The bureau purchased the *Eider*, formerly a deep-sea halibut vessel, for use as a tender between the Pribilof Islands and Alaskan Peninsula.

The work of the motor-vessel fleet of the Bureau of Navigation has been greatly increased because of the admirable working arrangement made with the Treasury Department, whereby such boats enforce not only the navigation and motor-boat laws, but the internal-revenue tax laws also applying to motor vessels. By this arrangement the Department has furnished during the fiscal year the motor vessels *Kilkenny* and *Tarragon*, with their officers and crews, and the Internal Revenue Bureau of the Treasury Department supplied the sum of \$5,000 as a part contribution toward the cost of fuel for the vessels, and paid also the salary of one officer.

Late in the year the motor vessel *Dixie*, belonging to this service, was restored by the Navy, and in addition two other vessels the *Siwash* and *Psyche II*, were turned over by them, so that the service will have during the current fiscal year five good motor vessels. The record of the past year shows the same satisfactory results as in previous years, but the number of vessels was less because the *Dixie* was in the Navy.

The mitigated fines and taxes collected as a result more than paid for the service. The work done for the Treasury resulted in the collections of large sums that would otherwise have been lost to sight, and was fully satisfactory to the officers of that Department.

It is proposed in the next calendar year to station the *Siwash* to cover the coast from New York east, the *Kilkenny* to patrol from New York to Wilmington, N. C., including Delaware and Chesapeake Bays and North Carolina sounds, the *Tarragon* to cover South Carolina and Florida waters, the *Dixie* the Mississippi River and tributaries and the Gulf coast, and the *Psyche II* to be on the Great Lakes. Full operation of these vessels in these areas will be contingent upon the funds available for their use. It can not be, however, emphasized too often that the work done by these patrol boats in enforcing the navigation laws in connection

with vessels plying our rivers, bays, sounds, and the inland waters along our coasts insures safety to navigation both for large and small vessels, and collects taxes which otherwise would not be collected, in such a way as to cost the Nation nothing, because the penalties which are imposed for violations, together with the taxes gathered, more than cover the cost of the boats and their repairs, maintenance, and operation.

The Department had the following vessels in its marine service on October 1, 1919:

Service.	In operation.	Not in operation.	Being built.	Sold.	Bought.	Turned over by Navy.	Loaned to Navy.	Returned by Navy.	Total.
Coast and Geodetic Survey.....	15			1		5		5	15
Bureau of Navigation.....	2	2					1		5
Bureau of Lighthouses:									
Tenders.....	54	1				2	47	47	54
Vessels.....	63	2	2				4	23	63
Bureau of Fisheries..	9			1	1	4		5	
Total.....	143	5	2	2	1	11	52	60	137

^a One sunk.

This is exclusive of 2 vessels loaned to the Coast and Geodetic Survey by the Philippine Government and of 54 motor boats of all sizes operated by the Bureau of Fisheries, and a large number of launches used at the various stations of the Lighthouse Service.

Incidentally it is worth mentioning that the steamer *Surveyor*, being constructed with that in mind, was ready without a day's delay to enter the naval service. Her successors will be similarly designed and built. It should be the case that every vessel of every maritime service of the Government should be designed so that if needed for the national defense they would be ready without alteration to do their special part. Such is the definite plan of this Department in the vessels that it builds, and it takes no small pride in the contribution that its ships, small as they are, rendered the national cause.

Vessels Urgently Needed for the Bureau of Lighthouses.

In the operation of the Lighthouse Service, covering 47,300 miles of general coast line and rivers, there are at present employed 54 lighthouse tenders and 63 light vessels, 117 in all. To maintain

this number 2 tenders and 2 light vessels should be built each year, and recommendations and estimates submitted yearly have emphasized this fact.

Since 1910 the number of aids to navigation has increased from 11,660 to 16,075, a total increase of 4,415, or 38 per cent. This increase has added greatly to the work of the tenders, so that the present number has become inadequate to maintain the service as required in the interests of navigation. There has also been an unusual number of casualties to vessels recently, 6 vessels having been lost, or condemned, as before stated.

As a result of careful study of the matter, it has been found that within the next five years 18 light vessels and 10 tenders should be replaced, and funds should be provided now for 17 of these vessels most urgently needed.

On May 15, 1919, in a letter to the Speaker of the House of Representatives, request has been made for a provision authorizing the construction or purchasing and equipping lighthouse tenders and light vessels for the Lighthouse Service of \$5,000,000. (See Appendix A.)

Buildings.

The buildings occupied by the Department of Commerce are:

1. Commerce Building, Nineteenth Street and Pennsylvania Avenue NW.
2. Bureau of Fisheries Building, Sixth and B Streets SW., and new adjoining fishery products laboratory.
3. Coast and Geodetic Survey Building, New Jersey Avenue near B Street SW., directly opposite the House of Representatives Office Building, and new adjoining chart, instrument, and archives building.
4. The Bureau of Standards, Pierce Mill Road, near Connecticut Avenue, is housed in 13 principal buildings and 7 minor buildings, 5 of the latter being temporary structures.

The fishery products laboratory had its rise in the necessity of developing under war conditions, as rapidly and broadly as possible, additional food supplies. Funds for the building were provided from the appropriation for the national security and defense. This laboratory is unique and its operations are expected to have a great and beneficial effect upon the fish industries and upon the food supplies obtained from them.

The new building for the Coast and Geodetic Survey, for which provision was made from the fund for the national security and

defense, though long delayed in its construction by the difficulty of securing the necessary materials during the war and since its close, is completed and its equipment in place. It was none too soon to meet the vastly increased demands for charts and service arising from the great increase in our merchant marine. If it is considered that to this well-known growth there was added also during the war an immensely increased demand for charts for the Navy, it will be clear that this service was called upon for an enormous expansion of its work at a time when a very large portion of its staff was absent, serving either in the Army or Navy at home and abroad, and when most of its vessels were taken from their regular duties to do naval work. It was only by untiring efforts, with equipment not intended for any such emergency, that sufficient charts were ready for the vessels as they were wanted. Fortunately, the crisis was met by new equipment, procured from war funds, without which the situation would have been serious. The new Harris automatic press was put into operation on January 7, and immediately made possible the mechanical production of charts in sufficient numbers to meet the need. The service is now better equipped than at any time in its history for the rapid production of charts, so far as its mechanical appliances are concerned.

The new building for the first time provides fireproof protection for the valuable records of the Coast and Geodetic Survey, which cover a period of over 100 years and represent an actual cash outlay of many millions of dollars.

These two buildings, in common with several erected at the Bureau of Standards, though built during and for the war, were so designed as to be equally useful and effective in peace. Every dollar of their cost is an investment, and not an expense, and will be permanently productive.

Land for a new building was acquired for what was then the Department of Commerce and Labor under the act of May 30, 1908 (35 Stat., 545), and, by the act of June 25, 1910 (36 Stat., 698), the Secretary of the Treasury was directed to prepare designs and estimates for a fireproof building to occupy the new site. On March 3, 1913, the plans for the proposed building were approved by my predecessor. Since that time three bureaus of the former Department have been transferred to the Department of Labor; one has gone to the Federal Trade Commission; two of the present services were omitted from the plans. The new

building, when redesigned, should be made to accommodate the office, the lithographing establishment with its accessories, the drawing room, and the instrument shop of the Coast and Geodetic Survey, and the administrative offices, and, if practicable, the laboratory of the Bureau of Fisheries. When this is done the property on Capitol Hill, adjoining the Public Health Service, opposite the House Office Building and near the Capitol itself, now occupied by the Coast and Geodetic Survey, could be used for other Government purposes, and in like manner the buildings now occupied by the Bureau of Fisheries will become available for other uses. The new buildings erected in connection with these two services are so designed as to be useful in other connections.

Five of the eight services of the Department, as well as the divisions of the Secretary's Office, are housed in the Commerce Building. The normal growth of these services, which are the Bureaus of the Census, Foreign and Domestic Commerce, Navigation, Lighthouses, and the Steamboat-Inspection Service, will overcrowd the building before the new one can be constructed. During the present year it has been necessary to house the division of statistics of the Bureau of Foreign and Domestic Commerce in the building occupied by the Council of National Defense.

The annual rental of the Commerce Building is \$65,500. This is at the rate of \$0.358 per square foot, gross. The lease of the building was renewed on July 1, 1919, for five years. During the pendency of this new lease the proposed Commerce Building should be redesigned and constructed, so as to be occupied by or before the lease terminates. In addition we are now paying an annual rental of \$1,225 for 4,900 square feet of storage space.

The comments heretofore made respecting the unfitness of the buildings occupied by the Coast and Geodetic Survey and by the Bureau of Fisheries are renewed. Reference is made to pages 10 and 11 of my annual report for 1918 and pages 218 to 220 of my annual report for 1917.

Bureau of Standards—Industrial Laboratory Building.

The great demands placed upon the bureau by the Government's war program made it necessary, early in the year, to build a larger laboratory building to house the work along the lines of structural materials and industrial research and related subjects.

The building is four stories, including basement, and has a frontage of 351 feet and depth of 166 feet. The main wings are 62 feet wide and the extensions 105 feet, forming an E-shaped ground plan.

The entire center wing is of special construction to provide for large testing machines. The central part is open from basement to third floor, with galleries surrounding the open well at first and second floor levels. The central well will ultimately be occupied by large vertical testing machines and the galleries by smaller testing machines. The two vacant spaces included in the E form of building have one-story courts covered by concrete roofs, each lighted by three large skylights.

Directly north of this building, separated from it by a driveway, is the new, one-story kiln building, 50 by 350 feet, which houses in its basement the heating plant for these two buildings. The end walls are connected with the industrial laboratory building by a brick wall, which contains an open archway for a driveway, so that the two buildings are in effect one large unit.

In the west extension is housed the section on cement, concrete, and building stone. It is fully provided with all necessary equipment for carrying out the research studies in this line, as well as attending to the large demands for routine tests of cement and concrete. Space is also provided for chemical research in the manufacture of cement.

On the second floor are the laboratories and offices of the section on lime, magnesite, and gypsum, these branches being similar in character to the cement work.

Various portions of the building are occupied by the sections on clay products and optical glass. They occupy the entire west court, which is equipped with special grinding machinery. The several types of furnaces used in the study and manufacture of these products are installed in the kiln house.

The central extension and the surrounding space for three floors are occupied by the metals-testing section, which is fully equipped to handle all physical tests of metals and metal structures, etc. The basement of the east extension will house the large horizontal Emery machine. When the installation of these machines is completed, this will be the most complete materials-testing laboratory, with machines of the largest capacity, in the world.

The work in textiles, paper, leather, and rubber is housed in the east part of the building, equipped with a large chamber in which is maintained an atmosphere of constant humidity and constant

temperature and various types of machinery necessary for the manufacture and research work in these materials.

On the third floor, in the central section of the building, are the laboratories for the work on lubricating oils.

The east court houses a machine shop for repairing the testing machines, preparing test specimens, and making new apparatus as required by the various lines of research.

The bureau's photographic department has a complete laboratory in the center wing on the third floor and is equipped to handle a large range of photographic work, from blue printing to the making of moving pictures.

Space is also allotted for a museum and display room to exhibit the various products and specimens of work accomplished, for a general library of books and periodicals dealing with industrial subjects, and for a lunch room and kitchen required to serve meals to the employees of the building.

Bureau of Standards—New Dynamometer and Altitude Laboratory.

The temporary wooden buildings, in which the altitude and dynamometer laboratories have been housed for the last year and a half, have now been replaced by a permanent structure of brick and concrete. This building has a rectangular floor plan measuring 50 by 150 feet.

Bureau of Fisheries—Laboratory Aquarium.

I have twice called attention to the need of a laboratory aquarium for the Bureau of Fisheries. (See pp. 12-14 of my annual report for 1917, and p. 11 of my report for 1918.) The prevailing cost of food is a continued, forceful argument in favor of the erection of this building.

It is true, of course, that in those features common to aquaria, the institution would be a source of education as well as of general popular interest, as are all of the famous aquaria. This, while valuable, is, however, not the essential purpose on which stress should be laid. Most important is the use of the aquarium as a laboratory for selecting and developing fishes as food, for their definite cultivation as food-producing animals, for treating this whole side of the animal kingdom with the same study and care as regards its possible service to mankind as is given to breeding cattle and sheep as producers either of dairy products

or of meat and of wool and leather. It does not reflect special credit upon our intelligence that, while doing so much and so well upon certain phases of animal industry, we neglect, indeed leave entirely untouched, another phase of which we know only that great possibilities exist which we have not tried to develop.

Long ago the Bureau of Fisheries established the fact that an acre of water on the farm could be made as productive of food as an acre of land. We have agricultural colleges dealing with the land acre and a great Government department ably cooperating with them. The water acres of the world are more in extent than are those of the land, and we are blest as a Nation with possibilities for aquatic life along our coasts and in our Great Lakes and streams such as is given to no other people of the world, yet we have not a single such station as is proposed, wherein, at an investment less than many an agricultural college has cost, we may study an even greater extent of food-producing possibilities.

The experience of the Bureau of Fisheries has shown that he would be very rash who would put limits to what our water areas could do in supplying food of many kinds. To argue from the past in this matter is to argue from times of ignorance, for within the last five years many fishes have become objects of common food, of which men knew hardly at all, and this process in many respects is capable of what seems unlimited extension.

Whatever the cause of the high price of food, its effect should be to make men eagerly study how food can be made to cost less, and that is what is now proposed.

Housing for the Bureau of the Census.

The Bureau of the Census will be housed during the census period, which began on July 1, 1919, in building "D," at Four-and-a-half Street and Missouri Avenue. The offices of the Director, of the division of manufactures, and of those portions of the service which are not specifically engaged upon the decennial census remain in the Commerce Building. The other branches have already been transferred to the new quarters and the force therein is being rapidly enlarged to cope with the work of the coming census. A clerical force of about 4,000 maximum will be employed in Washington on this work, and a great deal of space will be required for the many machines that will be used in tabulating the results of the census, and for storage for the millions of sched-

ules containing the data gathered by the field force and the 300,000,000 or more cards which will be used in tabulating the population and agricultural statistics.

Cooperation by the Bureau of the Census With Other Services and Organizations.

The Bureau of the Census and the Bureau of Education, Department of the Interior, are cooperating in taking the census of Alaska for 1920. The schedules, blanks, and other supplies have already been sent and work will begin immediately.

A conference was held between the Director of the Census, the chief statistician for manufactures of that bureau, and members of the National Industrial Conference Board of Boston and the National Association of Manufacturers, in order to insure the inclusion in the manufactures schedules of such inquiries as will be helpful and beneficial to industry. Schedules satisfactory to the industries and the bureau are being prepared.

The Geological Survey and the Bureau of Mines are cooperating in the compilation of information relative to the census of mines and quarries, in order to prevent duplication of work.

Archives Building.

It is earnestly to be hoped that the archives building, a design for which was authorized by the public buildings act of March 4, 1913, may be promptly constructed. The Department of Commerce will need not less than 85,000 cubic feet of space therein, with such additional room as will provide for ready accession and constant use of the records of this Department, dating back to the beginnings of the Government.

Urgent Needs of the Department.

Among the urgent needs of the Department are:

1. The provision of vessels for the Lighthouse Service, to which reference is made on preceding pages and in Appendix A.
2. The provision of funds to continue the work of the Lighthouse Service throughout the current fiscal year. The funds thus far appropriated are not sufficient, in view of necessary official increases of wages in other services, to carry the work of the Service much beyond the opening of the coming calendar year.
3. A building at the Bureau of Standards for a suitable power plant as recommended in my last annual report (p. 14).

4. A laboratory aquarium for the Bureau of Fisheries, treated earlier in this report.

5. A Government-owned building to house all the services of the Department, as recommended previously in this report.

6. An additional Assistant Secretary of Commerce to assist in the administration and supervision of the greatly increased work of the Department.

7. Special attention is invited to the recommendation under the title Steamboat-Inspection Service that the supervising inspectors of that important bureau be placed under the classified civil service.

A number of the urgent needs of the Department mentioned in my last report have already been met. Among these are:

1. The enlargement of the funds and the organization of the Bureau of Foreign and Domestic Commerce and a small but insufficient provision for more commercial attachés. The matter of proper payment for their clerks is still untouched.

2. Through the transfer of five vessels from the Navy the more urgent needs of the Coast Survey in this connection have been for the present met, and by the transfer of launches from the Navy **the need** for wire-drag launches in the Coast Survey is partly **covered**.

Following a suggestion made upon the floor of the House of Representatives by the former chairman of the Committee on Appropriations, Hon. Swagar Sherley, an effort was made with your approval to secure two special surveying steamers, similar in type to the *Surveyor*, from the United States Shipping Board, Emergency Fleet Corporation. The former chairman of the Shipping Board cooperated actively in the matter. At this writing, however, the subject is held up pending the discussion of certain legal questions, and its outcome is uncertain. Meanwhile the two vessels are greatly needed for deep-sea surveying, which can not be carried on upon any sufficient or properly economical scale without them.

3. An additional clerical force has been provided for the field work of the Steamboat-Inspection Service. An additional appropriation provided by the deficiency bill now pending may relieve the difficult situation in which the Coast and Geodetic Survey found itself by reason of the inadequate pay and the insufficient number of its draftsmen.

4. Provision was duly made for the census of 1920 and for housing the force necessary for that work.

5. An assistant has been provided for the Secretary of Commerce.

In the above way five out of eight urgent needs of the Department mentioned in my last report on pages 13 and 14 have in some measure received care.

Use of Motion Pictures in Industry.

Developments during the year confirmed the opinion that motion pictures can be made an important factor in governmental foreign-trade promotion. Experimental work initiated and carried on in China by Commercial Attaché Julean Arnold has been so successful that it has been impossible to supply films enough to meet the demands. It is a significant fact that the Chinese are keenly interested in films showing quantity production in American industry.

There has, however, been no appropriation available for carrying on this work on a suitable scale. Such films as could be obtained without expense from interested and far-sighted firms were sent to Mr. Arnold, who got such distribution as he could through chambers of commerce and other bodies. The success attained in this way indicates what could be accomplished with sufficient funds to carry on the work on a broad scale in all promising fields.

The case for the motion picture as a means of promoting our foreign trade in foreign countries was presented at a special hearing on March 1, 1919, before the House Committee on Interstate and Foreign Commerce, when attention was called especially to the fact that the value of this means of trade promotion had been proved, and that other Governments were already using it.

Reference is made to House resolution 571, Sixty-fifth Congress, third session, and to the report of hearings on moving pictures as a means of commercial promotion.

Pacific Cable Situation.

Existing facilities for transmitting cable messages across the Pacific Ocean are far from sufficient to meet the commercial demand. Chambers of commerce, business houses, and various commercial organizations have presented constant complaints of injurious delays, requesting that some remedy be applied adequate to meet the very unfortunate situation that exists.

The delays vitally impair the effectiveness of our foreign trade and have obliged business houses to undertake unusual and expensive expedients in order to transact their business at all.

We are in this important respect at a serious disadvantage compared with other commercial nations. Prices are often quoted and options given subject to acceptance within a given time, but in many cases when replies accepting quotations were delivered promptly to the cable they did not arrive in time to complete the transaction. There have, from this and similar reasons, been heavy losses in American export and import trade.

The subject has been one of careful study and of keen interest. On July 3, 1919, a report representing the joint views of the Bureau of Standards, the Bureau of Foreign and Domestic Commerce, and the then existing Industrial Cooperation Service was submitted to the Senate in connection with Senate bill No. 1651.

It is earnestly to be hoped that steps may be taken which will provide another cable under American control to the Far East, for to-day the United States is at a disadvantage in doing business with the Orient as compared with other countries.

Appropriations and Expenditures.

The itemized statement of the disbursements from the contingent fund of the Department of Commerce and the appropriation for "General expenses, Bureau of Standards," for the fiscal year ended June 30, 1919, required to be submitted to Congress by section 193 of the Revised Statutes of the United States; the itemized statement of expenditures under all appropriations for propagation of food fishes during the fiscal year ended June 30, 1919, required by the act of Congress approved March 3, 1887 (24 Stat., 523); and a statement showing travel on official business by officers and employees (other than special agents, inspectors, and employees who, in the discharge of their regular duties, are required to travel constantly) from Washington to points outside of the District of Columbia during the fiscal year ended June 30, 1919, as required by the act of Congress approved May 22, 1908 (35 Stat., 244), will be transmitted to Congress in the usual form.

The table following shows the total amount of all appropriations for the various bureaus and services of the Department of Commerce for the fiscal year ended June 30, 1919

Bureau,	Legislative act.	Sundry civil act.	Deficiency act.	Special act.	National se- curity and defense.	Total.
Office of the Secretary....	\$327,540.00				\$205,000.00	\$532,540.00
Bureau of Lighthouses...	65,430.00	\$6,483,000.00	\$753,577.87	\$748,297.00	275,000.00	8,325,304.87
Bureau of the Census....	1,349,240.00		16.35		160,000.00	1,509,256.35
Bureau of Foreign and Domestic Commerce....	554,120.00				325,000.00	879,120.00
Steamboat-Inspection Service.....	712,740.00		143,934.17			856,674.17
Bureau of Navigation....	217,045.00			736.65	40,000.00	257,781.65
Bureau of Standards....	1,299,860.00	40,000.00	107,240.48	105,000.00	510,800.00	2,062,900.48
Bureau of Fisheries.....		1,130,940.00	10,439.60		160,000.00	1,301,379.60
Coast and Geodetic Sur- vey.....		1,364,960.00			47,104.56	1,412,064.56
Total.....	4,525,975.00	9,018,900.00	1,015,208.47	854,033.65	1,722,904.56	17,137,021.68
Increase of compensation.	648,802.37					648,802.37
Allotment for printing and binding.....		400,000.00				400,000.00
Grand total.....	5,174,777.37	9,418,900.00	1,015,208.47	854,033.65	1,722,904.56	18,185,824.05

The following statement shows the expenditures during the fiscal year ended June 30, 1919, on account of all appropriations under the control of the Department, giving the total amounts disbursed by the various disbursing officers of the Department, and miscellaneous receipts for the same period:

EXPENDITURES.

By the Disbursing Clerk, Department of Commerce, on account of salaries and expenses of the Office of the Secretary of Commerce, the Bureaus of Foreign and Domestic Commerce, Navigation, Standards, Fisheries, the Census, and Lighthouses, the office of the Supervising Inspector General, Steamboat-Inspection Service, salaries and expenses of the Steamboat-Inspection Service at large, and public works of the Lighthouse and Fisheries Services (shown in detail in the first of the foregoing tables of disbursements)....	\$8,165,930.99
By the authorized disbursing officers of the Lighthouse Service....	7,165,538.34
By the special disbursing agent, Coast and Geodetic Survey.....	1,116,206.02
By special disbursing agents, Bureau of Fisheries.....	51,195.61
By the commercial agents of the Department investigating trade conditions abroad, as special disbursing agents.....	322,308.58
By warrants drawn on the Treasurer of the United States to satisfy accounts settled by the Auditor for the State and Other Departments.....	170,748.88
Printing and binding.....	399,961.32
Total.....	17,391,889.74

MISCELLANEOUS RECEIPTS.

Coast and Geodetic Survey: Sale of charts, publications, old property, etc.....	\$24, 052. 10
Bureau of the Census: Sale of publications, etc.....	282. 00
Bureau of Fisheries:	
Sale of 18,223 sealskins.....	741, 197. 42
Sale of fox and other skins.....	67, 588. 33
Sale of seal bones.....	2, 752. 80
Sale of old property, etc.....	11, 615. 66
Bureau of Navigation:	
Tonnage tax.....	1, 265, 229. 23
Navigation fees.....	143, 492. 19
Navigation fines.....	162, 146. 50
From deceased passengers.....	460. 00
Bureau of Standards: Sale of old property, etc.....	12. 50
Steamboat-Inspection Service: Sale of old property, etc.....	31. 55
Bureau of Lighthouses: Sale of old property, rentals, etc.....	35, 372. 69
Office of the Secretary: Sale of old property, etc.....	1, 054. 58
Total.....	2, 455, 287. 55

In the last seven years the Department of Commerce has turned back unused into the Treasury the following amounts:

June 30, 1913.....	\$618, 970. 01	June 30, 1918.....	\$149, 009. 51
June 30, 1914.....	347, 162. 48	June 30, 1919.....	476, 045. 10
June 30, 1915.....	247, 482. 22		
June 30, 1916.....	227, 941. 92	Total.....	2, 244, 606. 51
June 30, 1917.....	177, 995. 27		

There is a general impression that money appropriated means money spent. Yet here is a total of \$2,244,606.51 which could have been expended for the purposes named, but was not. In business circles such action would be deemed commendable and would win confidence of financial authorities in the wisdom of the disbursing organization. The reverse is true, however, in the Government under the existing system. The inference is not drawn from such facts by appropriating committees that care has been used in expenditure and so something has been saved for the Government, but rather that the estimates were, in the first instance, extravagant and blameworthy. Almost the first question asked when considering estimates is what the unexpended balance was the previous year, and it is argued that if last year a considerable balance remained less is needed for the coming year. The very economy resulting in the balance saved is made the basis for mulcting a service on its necessary expenditures in the future.

This is here pointed out as one of the faults, minor but real, of the present system of appropriating funds for Government purposes which it may be hoped a modern budget system would

remove. When the writer was an officer of the City of New York a direct incentive to saving was provided by the city charter which permitted unexpended balances to be used under the authority of the board of estimate for other work. Under such a system an executive naturally saved all he could in order to do as much work as possible with what remained. Under the present Government system the temptation is direct to use as nearly as possible all of the appropriation lest one be mulcted in the coming year and have insufficient funds for necessary work.

Estimates for Fiscal Year Ending June 30, 1921.

The estimates for the fiscal year 1921 aggregate \$35,318,068.40, and exceed the appropriations for the fiscal year 1920, amounting to \$29,052,955, by \$6,265,113.40.

The estimates include an item for the Fourteenth Decennial Census amounting to \$6,215,000.

The estimate is submitted in this form in view of the fact that it is impossible to apportion, with any approach to accuracy, the cost of the work during the second year of the decennial census period.

As the legislative, executive, and judicial act, approved March 1, 1919, carries an appropriation of \$15,000,000 for Fourteenth Census work, this will make a total of \$21,215,000 required for the Fourteenth Decennial Census period.

The total amount requested in last year's estimate for the Fourteenth Census period was \$20,500,000, or \$715,000 less than the total amount now estimated. This is accounted for as follows:

Since the original estimate was prepared, provision for an additional inquiry, relating to encumbrances on homes, was inserted in the census bill by the Senate and was enacted into law. The inclusion of this inquiry will add approximately \$1,000,000 to the cost of the Fourteenth Census. An additional estimate of \$50,000 has been made necessary for the construction of a fireproof vault installation of freight elevators, the strengthening of floors, etc., at the temporary war building, which has been assigned to the bureau for the use of the Fourteenth Census force.

The original estimate of \$300,000 for rent of buildings in the District of Columbia, and \$35,000 for fuel contained in last year's estimates, have been eliminated on account of the assignment to this bureau of the temporary war building. The cost of heating

that building will be paid by the Office of the Superintendent of the State, War, and Navy Building.

These changes are equivalent to a net increase of \$715,000.

The estimates submitted by the Lighthouse Service show an increase over appropriations of \$9,329,338.40. They include items of public works approximating \$8,000,000, of which items amounting to \$1,500,000 have been heretofore authorized by Congress. Fourteen items amounting to \$6,375,750 have not yet been authorized, but are urgently needed for the Service.

The increase for the Bureau of Foreign and Domestic Commerce is \$747,910, of which \$117,410 is for salaries for additional employees in Washington to enable the bureau to keep abreast of the ever-increasing work and \$410,000 additional is needed for the field service in this country and abroad. Sixty-nine thousand dollars is required for the development of trade by motion pictures, and \$151,500 is asked for post allowances for men in foreign service, for transporting their families, and for bringing home the remains of such as may die abroad.

The Steamboat-Inspection Service submits estimates increasing the amount appropriated for 1920 by \$97,320, as the Service is being called on continually to do more work incident to the country's shipping program.

The increase for the Bureau of Navigation is \$174,204 to enable the bureau to take care of the ever-increasing shipping problems which by law are imposed on this bureau.

The war added many new investigations to the Bureau of Standards, the cost of which during the war was borne by other departments and the President's fund, and approximately \$2,000,000 additional is required to enable the bureau to pursue these investigations, which will result in great benefit to the Government and general public in peace times.

The Bureau of Fisheries asks \$637,880 additional, and the Coast and Geodetic Survey submits estimates which exceed the appropriations for 1920 by \$2,000,000, over \$1,000,000 of which is required for new vessels.

Increases of salaries for employees in the District of Columbia are not included in the recommendations of this Department because the matter is under consideration by the Joint Commission on Reclassification of Salaries, and request will be made in the Book of Estimates that appropriations for these salaries be adjusted in accordance with such recommendations of the commission as receive the approval of the Congress.

This Department desires that such recommendations for increased salaries as may be recommended by the Joint Commission on Reclassification of Salaries be considered in connection with the estimates of this Department.

Personnel.

The accompanying table shows, by bureaus, the number of permanent positions in the Department on July 1, 1919, and the increase or decrease in each bureau as compared with July 1, 1918. The figures do not include temporary appointments, nor do they include the following appointments or employments not made by the head of the Department: Persons engaged in rodding, chaining, recording, heliotroping, etc., in field parties of the Coast and Geodetic Survey; temporary employments in field operations of the Bureau of Fisheries; mechanics, skilled tradesmen, and laborers employed in field construction work in the Lighthouse Service. Enlisted men on vessels of the Coast Survey in the Philippine Islands and officers and men of the Navy Department employed on vessels of the Bureau of Fisheries are also excluded. The total of these excluded miscellaneous employments and enlistments is approximately 5,000, as compared with 4,444 for the fiscal year 1918. At the close of the fiscal year 1919 there were 1,262 employees in the service of the Department serving under temporary appointment or employment.

The total number of permanent positions referred to in the accompanying table, together with the employments and enlistments just mentioned, on July 1, 1919, was approximately 12,340, as compared with 11,051 on July 1, 1918.

Superannuation and Retirement.

The annual reports of this Department during the past six years have presented the subject of retirement of superannuated and disabled Government employees. Hence it may hardly be necessary to add further expression of my views; yet I regard the subject as of such importance that I must not leave undone anything within my power to advance it. I look at it from the standpoint of common justice, on the one hand, and from that of efficient service, on the other hand. Large private concerns recognize that a lifetime spent in their service carries with it an obligation of honor toward the employee who has thus served faithfully when years make him incapable of further effective work. The business house that would turn out an aged employee,

saying to him in substance "Now look out for yourself" after a long and good record would be damned by the common opinion of the business world, and deservedly so. The only conceivable excuse that could be made would be that the employer had paid during the long service a sufficient salary over and above all the exigencies of life to have enabled the employee to provide himself for his own old age. No one will charge the Government with doing that. Failure to be as just in these matters as private concerns are, injures the Government either by causing the ambitious to seek better opportunities elsewhere or by relaxing the efforts of its employees generally through the unconscious drag that comes from hopeless service. The result of the present condition is seen in the survival of many old people in the Government work who struggle on because they needs must, when they should have ceased from their labors. Enactments requiring these aged workers to be discharged are substantially repealed by the higher law of humanity. They are demoted and maintained at reduced pay, thus creating what is in substance a pension without retirement, without the dignity of a recognition by the Government of their worth, and maintaining the inefficiency which everyone seeks to remove.

I am not especially concerned as to the details of any measure that may ameliorate this evil. During the present Congress many bills have been introduced for this purpose, one, the Lehlbach-Sterling bill, has passed the House of Representatives and has been introduced into the Senate. It may, perhaps, be susceptible of improvement, but it is a recognition of a claim and an attempt to remove an incubus on the wheels of governmental business. It is to be hoped that the bill may shortly become law, and thus at once justly provide for those who have served many years, open the door to more rapid promotion and to larger opportunities for younger and more active employees, and make the Government work more efficient not only through the removal of ineffectives, but by the unconscious but very real self-discipline that comes in response to wise and far-seeing treatment of the employee. I firmly believe that after a year of experience with any sound retirement system no voices will be lifted against it.

Salaries.

The Department has followed its usual practice of filling vacancies by promoting the clerks in the service instead of filling the

higher-salaried positions with appointees from the civil-service registers without experience in Government work. It has been shown by experience to be a wise course, for it gives to every clerical employee assurance that faithful attendance to duty will bring about promotion in due time. It has developed, however, that many of the \$900 positions can not be filled permanently, as that entrance salary, even including the bonus of \$240 allowed during the present year, possesses no attraction as compared with the compensation offered by private employers. Competent clerks could be secured before the war at an entrance salary of \$900. They can not be had now. The positions that are thus vacant are needed for the work of the Government. The inability to fill them reduces the force, already insufficient, and imposes an undue strain upon employees in the higher grades whose duties are already heavy.

The present \$900 entrance salary for clerks should be abolished. Even with the bonus it is not sufficient to secure experienced clerks, notably stenographers and typewriters, who can readily obtain from \$1,200 to \$1,500 per annum elsewhere. There is a chronic dearth of this class of eligibles on the registers of the Civil Service Commission. The entrance compensation for clerks should be at least \$1,200 per annum, which is not more than is paid in many places for common labor.

The Nolan minimum compensation bill now before Congress is an attempt to minimize the hardship involved in the combination of low salary and high cost of living in cases where it bears most heavily. It is, however, but a partial solution of the problem. It is hoped that systematic and adequate relief in this respect will be accomplished through the work of the congressional Joint Commission on Reclassification of Salaries established under the act of March 1, 1919.

The Department has cooperated actively with the Joint Commission on Reclassification of Salaries and hopes that the studies of that commission will result in an improvement of existing conditions. The plain fact is that many of the Government workers are to-day unable to live, even with the severest economy, upon the pay which they receive. They are forced to run into debt, are obliged to seek separate means of adding to their income, or are forced to withdraw from the service because other employers are more appreciative than the Government of existing conditions.

The legislative, executive, and judicial appropriation act approved March 1, 1919, provides \$240 per annum increase of compensation for the fiscal year 1920, in lieu of the \$120 bonus allowed during the past fiscal year, in recognition of the necessity under present living conditions for upward revision of salaries. This but partially meets current necessities. The temporary increase is not comparable with the increase in the cost of living.

If, to the high prices of all necessary articles required for living, there be added the demands for subscriptions to Government loans, to the Red Cross, calls for the purchase of War Savings Stamps, and other outlays which, however fine, useful, or even thrifty, still call for payment from a fixed sum of amounts which are large in proportion thereto—if, let it be repeated, these demands are aggregated and against them is weighed the fact that during one fiscal year a bonus of but \$120 was added and in a second year a bonus of \$240, it must be evident not only that these bonuses are hopelessly inadequate to meet the situation, but that the net result of the pressure upon many faithful and hard-working people has been really tragic. It is astonishing how generous the working force of this Department has been in matters of public helpfulness when the conditions of life have been so hard.

There have, furthermore, been cases where real injustice has been done. In the Lighthouse Service the salaries of keepers have been raised by the act of Congress approved June 20, 1918. In the same Service the wages of seamen and officers on board vessels have also been raised, following the official action of the Navy Department and the Shipping Board. This, however, has left the field supervising and clerical force where they were before the war, save for the bonus. The result has been an actual discrimination against a portion of a service quite as worthy as those who have been more favored. Yet the requests made of Congress for funds sufficient to remove this act of real injustice have been refused. Under date of August 14, 1919, the superintendent of the eighteenth lighthouse district (San Francisco, Calif.) wrote the Commissioner of Lighthouses as follows:

The base pay of \$960 per annum with a bonus of \$240 per annum is practically the lowest paid by any Government service in this city, and only the poorer class of eligibles will accept an appointment in this district. It is feared that with this low base pay a class of clerks far below the average in efficiency will enter the Lighthouse Service and in the course of time prove a very serious handicap to the handling of the district work.

Indeed the funds allotted for the Lighthouse Service in all respects, whether as to keepers' salaries, the wages of seamen and officers on vessels, or the wages of its field supervising and clerical force, are far from sufficient to carry that Service through the fiscal year, and a very considerable sum will be necessary unless the work of that Service is to be actually shut off in large part before the year closes.

During the last two years the Bureau of Standards has lost nearly or quite 50 per cent of its technical staff. This applies to all grades of trained scientific and technical men, but is especially true of the leaders in specific lines. The salaries of these men in the laboratories of the industries or in consultation work are usually double those which the Bureau of Standards is permitted to pay. To make this entirely clear a table is given below in which the names are represented by letters, stating actual cases of experts who have left the service for other salaries and giving the salaries paid elsewhere:

Name.	Title at Bureau.	Bureau salary.	Salary outside.	Title outside.
A.....	Chief of paper section.....	\$2,700	\$7,200	Director of department of technical control of the largest paper concern in the country.
B.....	Senior associate physicist in metallurgical division.	3,300	5,000	Research metallurgist in large metal corporation.
C.....	Electrical engineer.....	3,300	4,500 and promise.	Electrical engineer.
D.....	Chief of textile section.....	2,500	About double.	Consulting textile expert.
E.....	Associate physicist, in charge paper laboratory.	2,500	Nearly double.	Head of research utilization and new developments in a large paper concern operating 12 mills.
F.....	Chief, magnetic laboratory....	2,500	Two or three times more. ^a	Consulting expert.
G.....	Gas engineer.....	2,520	3,300	Gas engineer in large gas corporation.

^a Refused outside offer of \$7,500.

The following table gives cases in which private firms have offered the technical experts of the Bureau of Standards higher salaries than those they are receiving. In some of these cases the experts were asked by outside employers to name their own price, yet they have remained at the Bureau of Standards at a personal sacrifice, which it is wholly unfair as well as unwise to ask them longer to continue.

Name.	Title at Bureau.	Bureau salary.	Salary outside.	Title outside.
H.....	Chief, division of ceramics and optical glass.	\$4,800	\$10,000	Ceramics chief.
I.....	Physicist and chief of the metallurgical division.	4,000	7,500	Scientific metallurgist in charge of American end of large metal corporation.
J.....	Optical-glass expert.....	2,500	5,000	Technical expert in optical-glass factory.
K.....	Associate physicist and metallographist.	2,700	4,000	Metallographist in aluminum corporation.
L.....	Chief, gage section.....	3,000	^a 5,000	Chief of gage manufacture in large industrial concern.

^a Contract arranges for increase; base salary is guaranteed.

The above examples are chosen from the higher grades, but facts in the same proportion exist in all grades of the scientific and technical staff. If this process is to continue, many lines of the bureau's investigational work will have to be abandoned. The best we can hope to do at the low salaries now provided is to maintain a few untrained men for routine and testing work, and even this will suffer for lack of proper supervision.

The Bureau of Standards has more than 100 specialized lines of scientific and technical work. Each demands an expert of experience and ability, able to plan and supervise research and testing of a superior grade. The bureau can not pay the salaries demanded by men who are already trained and have the requisite administrative experience, since there are but 30 positions in the grades from \$3,000 to \$3,500 per annum, inclusive.

A critical situation, therefore, arises, since, even when the bureau trains competent men and fits them to become chiefs of sections, the industries pick them off as fast as they become thoroughly competent. The reason is solely the low salaries the bureau is able to pay and (even at such salaries) the relatively small number of good positions compared with the number of specialized fields in the bureau. The case becomes even more serious when it is remembered that the Bureau of Standards is expected to be the leader in each of these specialized fields of scientific and technical work.

At least 10 Government boards and commissions have chiefs who receive in excess of that paid at the Bureau of Standards. The salaries of such chiefs range from \$7,500 to \$12,000 for training and experience not more highly technical or exacting than that required for the Bureau of Standards. The highest technical salary (apart from Director) at the Bureau of Standards is \$4,800.

The following partial list shows Government positions paying in excess of the bureau's maximum:

Federal Trade Commission:		Pan American Union:	
5 commissioners.....	\$10,000	Director general.....	\$7,500
1 secretary.....	5,000	Assistant director.....	4,700
U. S. Tariff Commission:		Federal Reserve Board:	
Chairman.....	7,500	Chairman, Secretary of	
5 commissioners.....	7,500	Treasury (ex officio).	
Secretary.....	5,000	Governor.....	12,000
U. S. Shipping Board:		Vice governor.....	12,000
5 commissioners.....	7,500	3 members.....	12,000
Secretary.....	5,000	Comptroller of Currency (ex	
2 special experts.....	5,000	officio) (plus \$5,000,	
Chief counsel.....	10,000	Comptroller's salary).....	7,000
Board of Mediation, etc.:		Secretary.....	9,000
Commissioner.....	7,500	1 chief of division.....	6,000
Assistant commissioner.....	5,000	1 chief of division.....	5,500
Interstate Commerce Commis-		International Joint Commission:	
sion:		Chairman.....	7,500
9 commissioners.....	10,000	2 commissioners.....	7,500
Secretary.....	5,000	Secretary.....	4,000
Federal Board for Vocational		Panama Canal:	
Education:		General purchasing officer..	4,620
3 members.....	5,000	Inspecting engineer.....	4,400
Chief of division.....	6,000	Chief clerk purchasing de-	
2 chiefs of divisions.....	5,000	partment.....	4,000
2 assistant directors.....	4,500	Assistant auditor.....	4,000
1 assistant director.....	4,250	Assistant engineer.....	3,720

The above table shows that 19 positions outside of the Bureau of Standards pay double the maximum expert salary. Salaries of \$10,000 and over per annum are not at all unusual with large industrial corporations for experts carrying on scientific and technical work; yet these men thus paid are those who consult the experts of the Bureau of Standards and are assisted by them.

It would be interesting to compare the salaries paid in the Railroad Administration not only with those given members of the Cabinet, but those paid the heads of country-wide services employing thousands of men and large equipment. It is a plain truth that on the whole the insufficiency of Government salaries in the higher, responsible positions approaches the scandalous.

By the act of Congress approved July 2, 1918, the pay of the inspectors of the Steamboat-Inspection Service was materially increased. The increase was, however, not as great as it should have been, nor proportionate with the increase received by men in outside employment doing the same kind of work.

The clerks in the Steamboat-Inspection Service should also receive an increase in pay. The work of the field clerks of the

Steamboat-Inspection Service is of a peculiar nature. It is well known that the maritime law is entirely different from the common law, and that the rules and procedure in admiralty are entirely different from the other procedure, and in the same way the organization of the Steamboat-Inspection Service is peculiar to itself. No other bureau in the Government has as many unusual and peculiar conditions to meet as the Steamboat-Inspection Service. The clerks must, therefore, be especially trained for the work they have to do before they are in any way efficient. The expansion in shipping has been tremendous, and incident thereto an enormous increase in the amount of work of that service. This work has been done without a murmur, and, as the inspectors have been rewarded, so should the clerks be.

The salaries for the vast majority of the classified positions in the Bureau of Fisheries have remained virtually stationary for about 30 years.

There is a large loss of effectiveness because of the grossly inadequate salaries paid throughout the service, but especially in the technical grades. It is unfair and demoralizing to employees qualified in fish culture, biology, and fishery technique to receive on the average much lower compensation than is given to unskilled laborers in private business.

The bureau has 13 clerical positions at \$900 each, and only 22 of higher grades, with salaries ranging from \$1,000 to \$1,800. The service is overcrowded at the bottom, and there is little opportunity for advancing capable and deserving employees. From July 1, 1917, to July 1, 1919, there have been 16 resignations in the \$900 grade because better pay could be obtained elsewhere. The present condition is very serious, due to the difficulty of obtaining and retaining intelligent employees with ability and initiative. The time of chiefs of division is occupied to such an extent by routine work that should be handled by subordinates that they have altogether too little opportunity for the important administrative matters of their divisions.

A readjustment of salaries in the field force attached to hatcheries is imperative. The present rate of pay was established more than a quarter of a century ago. The bureau for several years has been unable to induce desirable and qualified persons to enter this service at the meager compensation offered. The statutory base pay for apprentice fish-culturists is from \$600 in the United States proper to \$900 in Alaska; \$900 to \$1,200 for

fish-culturists and foremen; and \$1,500 for station superintendents. The latter officials are responsible for Government property valued at thousands of dollars and for the efficient operations of their respective hatcheries where important fish-cultural operations are carried on. The lowest base compensation for the grades mentioned should be \$900, \$1,200, and \$2,000, respectively.

It must be remembered that the Bureau of Fisheries requires a force especially equipped for its work. All of its employees must be trained for the business, and before receiving permanent appointments must pass a suitable civil-service examination.

The wage problem in the vessel service is a similar one. The positions of assistants in charge of divisions require men with long, technical training and experience and are now filled by highly qualified persons whose work is most effective and meets with the hearty support of the fishery interests and the general public. The present salaries attached to these positions are materially under those for corresponding positions or similar service in other bureaus of the Government. In 12 bureaus of 3 departments, excluding the Bureau of Fisheries, the average salary paid to a division chief or for similar positions is \$3,473, while in the latter Bureau it is \$2,600.

The bureau is now faced with the serious problem of preventing the inevitable deterioration of the service if it is to be composed of only those who can find no other employment, those who have independent means, or of those who will voluntarily forego the privileges and responsibilities of family life or condemn their children to the deprivation of many ordinary comforts and the opportunities for special education.

I invite attention to the nature, extent, diversity, and amount of the work performed by the Commissioner, Deputy Commissioner, chief clerk, and chief of tonnage division of the Bureau of Navigation in the hope that these officers may be paid properly. All these officers are men who by long training and experience are especially qualified for the work. The increase recommended is not based entirely on the work of this bureau during the past four years, which was increased rather than diminished by the multiplication of marine agencies and the scattering of marine work among them during the war. Although most of the statutory work of the Bureau of Navigation continued to be performed during this period, much of its time and efforts were required to

assist other branches of the Government, hurriedly organized, and in consequence not conversant with all the subjects with which they had to deal or with the acts of Congress governing those subjects and not to be ignored.

My recommendation is based on the elementary principle that the laborer is worthy of his hire. The Bureau of Navigation since 1884 by statute has general superintendence of the commercial marine and merchant seamen. This general jurisdiction of late years has been extended by the addition of new specific duties developed by inventions and progress such as the administration of laws relating to wireless apparatus and operators, motor-boat legislation, and other services specially provided for. The essential fact, however, is that we now have a merchant fleet in tonnage alone almost double the commercial fleet of 1914. Of more consequence, however, than the amount of tonnage is the fact that we now have in foreign trade alone a tonnage equal to that of our entire merchant fleet in 1914. During the current year this fleet will probably be increased by nearly 4,000,000 gross tons. In the foreign trade our ships must conform in many respects to the laws of the countries they visit, and the whole range of duties involved in Government supervision over and cooperation with merchant shipping is thus extended and made difficult by comparison with the simpler duties the Government assumes in the regulation of the domestic or coasting trade. My own observation accords with the views of practical shipping men and shipbuilders that the great increase in our fleets and their radius of commercial activity, due partly to the stimulation of the early years of the war, partly to the great appropriations by Congress after we entered the war, call for a better-paid and increased force to deal with shipping matters. With the concurrence of the Bureau of Navigation the necessary steps to remedy this condition were held in abeyance during the war, and since the end of the war nothing has been done in this connection.

The Commissioner of Navigation is probably the country's leading expert in the law, customs, and practice of the maritime profession. His long service of over a quarter of a century has given him peculiar familiarity with our national maritime laws. He is personally acquainted with the leading maritime officers, private and public, of other nations, and his counsel is by them sought and respected. It is a pitiful thing that such an officer should have to serve for a salary as small as \$4,000 per annum.

This is the smallest salary paid any bureau chief in the Department of Commerce and less than is paid in other positions of inferior authority.

The work of the Deputy Commissioner requires not only a knowledge of the application of the many laws administered by the bureau, but also judicial sense in the consideration annually of about 7,000 applications for the mitigation or remission of penalties in which he takes the preliminary action and makes recommendations. Direct administrative supervision of the various services of the bureau in the field requires also good business sense and promptitude. The Deputy Commissioner has amply demonstrated to my own satisfaction, and, I am confident, to the satisfaction of those who have dealings with this office, the possession of those qualities.

Through long experience the chief clerk has an intimate acquaintance with all phases of the bureau's work and with its relations to other branches of the service both here and in the field which it is hard to assess in money terms. I know of very few others who do so much work on which general reliance for accuracy must be placed who receive pay so incommensurate with the work.

The record and statistical work of this bureau in charge of the head of the tonnage division of only eight clerks is accepted as authority both here and abroad, and during the past four years, when attention has been focused on shipping, the work and forecasts of the chief of this division has stood all tests of criticism.

The salaries provided for the executive officers of the Bureau of Foreign and Domestic Commerce are entirely inadequate for the class of men demanded and the services performed. Increases should be provided, at least, for the Director, the two Assistant Directors, and the chief clerk. It is recommended that the salary of the Director be raised to \$8,000, of the First Assistant Director to \$4,500, and of the Second Assistant Director to \$4,000, and that the chief clerk be made an administrative assistant at \$3,500.

A number of new positions should be provided in order to carry on the more important work of the bureau, as well as in the clerical grades. Requests have, therefore, been made for one additional chief of section at \$2,500, one at \$2,250, and four at \$2,000 each, and an increase of six assistant chiefs of divisions at \$2,250. Recommendations for 1 additional clerk at \$1,800, 14 at \$1,600, 2 at \$1,400, and 56 at \$1,200 are also submitted.

In arriving at the estimate for increases in the statutory force, the Bureau of Foreign and Domestic Commerce believes that the force recommended is the absolute minimum if it is to distribute to the public properly and promptly the mass of material furnished by its field employees, as well as by the consular officers throughout the world.

As a result of the funds appropriated by Congress to meet the increased cost of living abroad, the Bureau of Foreign and Domestic Commerce was able to grant post allowances (which were urgently needed) to the commercial attachés and their secretaries. Even with these increases in income, three of the attachés resigned during the year to accept more remunerative positions in private employ. It has been impossible at many posts to obtain or retain capable secretaries because of the low salary limit imposed by law and the exceptionally high cost of living abroad.

The question of obtaining living salaries for the employees of the Coast and Geodetic Survey is a vital one. This bureau was organized in 1816; and is the oldest scientific arm of the Federal Government. At its beginning the entire field force consisted of the Superintendent at a salary of \$6,000 per annum and the two or three engineers under him, and necessarily the work, though most important, was comparatively limited in extent. To-day the field extends over and around the entire United States possessions, and the field and office force are commensurately greater and the labor far more arduous. The only element that has not largely increased is the recompense of the officers and men. Beginning with the Superintendent, his salary 103 years ago was \$6,000 and still remains the same. The hydrographic and geodetic engineers, while receiving slight increases during the past five years, should have years ago been paid salaries as large as those paid officers in the Army and Navy performing similar services.

Nearly 20 per cent of the commissioned officers of this service have resigned during the period January 1 to October 1, 1919. These officers give in every case as a reason the fact that they can not live on the wages which the Government pays. As this is written, there is published a statement respecting the officers and men of the Navy to the effect that hundreds of naval officers are resigning because of insufficient pay, and an increase is said to be sought in the officers' pay of 30 per cent and in the pay of seamen of 50 per cent over the present rate. It is earnestly

hoped these increased recompenses may be permitted, and that the bill providing for this increase may be amended to include the commissioned personnel of the Coast and Geodetic Survey, as requested by me in a letter dated October 1, 1919, to the Speaker of the House of Representatives.

Further, the bureau has need for many more computers than are now authorized, and the entrance and lower-grade salaries should be made higher. There are portfolios of field observations containing thousands of triangulation and precise leveling observations in the archives of the bureau that have never been computed. Indeed, so inadequate is the computing force of the bureau to meet the present needs, that the expedient has been adopted of putting into print the results from the latest field work and gradually working backward into the old material. If this were not done, the work would be very many years old before it would be put into print. As it is, the public is deprived of the benefits of this information that has cost many years of labor and many thousands of dollars. The cost of the computation and printing would be but a fractional part of the expenditures that have already been made. The publications of the bureau containing triangulation and precise-level data are issued in a form that is neither satisfactory nor economical. They met conditions that existed years ago. In order to issue the publications, in the form now most useful—that is, so that each of the State publications would contain all the data available at the time the publication was issued—would require additional computations in the Washington office of the Survey.

The instrument makers of the Survey are trained along the lines of a physicist and mechanical engineer, yet these experts, who make the most delicate instruments in the world, are in some cases paid no higher salaries than a fair clerk, and in no case as high a salary as he would receive in the Navy or Shipping Board.

One of the most conspicuous evidences of injustice is the marked discrimination against the clerks. Of the number called “clerks” in the Survey nearly half are specialists and have technical knowledge that is of the greatest value to the Government; yet the plea to have them properly designated and given just and fair salaries has thus far gone unnoticed. The request to no longer carry the \$720 statutory places has been heard, but this is only a beginning, and until it is realized further in the shape of tangible action, the service must continue to suffer by resignations and inability to fill the places except with incompetent persons. There

are but 43 clerks in the Survey, and during the past fiscal year 66 clerks left that service.

The bureau's valuable and highly trained copper engravers have been for years without salary increases, and now their righteous dissatisfaction is evident, and unless action is taken in their behalf the service will permanently suffer.

And so on down to the messengers and laborers. A man with ambition will not work for \$1.50 or \$2 per diem when he can earn \$3 somewhere else in the Government service. This bureau has had to hire boys to do men's work, who on account of age and education are totally unfit to fill the positions, and with such conditions even boys will not stay long.

Transportation of Families and Effects of Officers and Employees.

It has been very difficult in the past, owing to the small salaries we are able to pay, to secure properly qualified men to take charge of our commercial-attaché offices abroad and to conduct special investigations in the various foreign countries. One of the greatest drawbacks has been the fact that in nearly every case the men selected desire to take their families abroad, especially when they are to remain abroad for an extended period. They also often wish to take at least some household equipment. Under the present scale of salaries we are denied the services of many highly qualified men owing to their financial inability to take with them their families and effects. To meet this situation I am recommending that Congress allow \$50,000 to pay the actual and necessary expenses for transporting families and effects of officers of this Department who are sent abroad on official business. It hardly seems proper to require these men to pay, out of their own pocket and from a small salary, expenses necessitated by Government business, and which would not be otherwise incurred.

Transporting Remains of Officers and Employees Dying Abroad.

Under present conditions, if deaths occur in our force abroad the family of the deceased would have to assume the care and expense of having the remains returned to this country. This occurs at a time when it is possible the financial affairs of the deceased are in such condition that the family would be considerably embarrassed. The State Department has a fund to provide for such expenses, and I earnestly recommend that provision be made to remove this weakness in our provision for foreign service. An estimate has been submitted to Congress covering this matter.

Printing and Binding.

The Department's allotment of the appropriation for printing and binding for the fiscal year ended June 30, 1919, was \$400,000. In addition, the allotment was credited to the extent of \$23.47 for miscellaneous blank forms furnished by the Coast and Geodetic Survey to the Chief of Engineers, War Department, thus increasing the amount to \$400,023.47. Of this sum \$399,961.32 was expended, leaving an unused balance on June 30 of \$62.15. From allotments made to the Department from the national security and defense fund there was expended for printing and binding the sum of \$5,573.96. The increase in expenditures in 1919, compared with 1918, was \$10,583.04 (or 2.68 per cent), the expenditures in 1918 being \$394,952.24.

During the decennial census period of three years beginning July 1, 1919, the Bureau of the Census will not participate in the Department printing and binding allotment, as the work for that bureau, including the cost of completing operations on its work remaining unfinished at the close of the fiscal year 1919, will be paid for from the appropriation for the Fourteenth Census. The estimated cost of unbilled and uncompleted work of the Department, exclusive of that of the Bureau of the Census, at the Government Printing Office on July 1, 1919, and chargeable against the allotment for 1920, was \$27,117.40, while such work at the Government Printing Office on the same date in 1918 actually cost \$43,615.41. Including the work of the Bureau of the Census, the figures for this item for the past two years are as follows: 1919, \$64,994.75; 1918, \$74,882.95. There was also at the Government Printing Office at the close of the year work for the Department chargeable against the national security and defense fund estimated to cost \$23,266.89.

Work of the Solicitor's Office.

During the fiscal year ended June 30, 1919, 217 contracts, totaling \$1,541,221, together with 18 contracts of indeterminate amounts; 91 leases, amounting to \$423,938; 20 revocable licenses amounting to \$3,801; 2 deeds in the sum of \$3,305; 108 contract bonds, amounting to \$323,796; 115 official bonds, amounting to \$590,500; and insurance policies amounting to \$137,400 were examined (approved, disapproved, drafted, redrafted, or modified).

The number of legal opinions rendered, formal and informal (memorandum), totaled 258. Legislative matters handled, which concern the Department of Commerce (drafting and redrafting of

bills, reports relative thereto, etc.) numbered 366. In addition, 1,534 miscellaneous matters, embracing everything submitted for the advice or suggestion of the Solicitor, or for the formulation of departmental action, not included in the foregoing items, were handled by this office.

Development of Waterways.

I renew the suggestion that every economic, military, and naval argument urges the earliest possible development of a Government-owned waterway connecting all the great cities of our Atlantic seaboard with one another, with the New York State waterways reaching to the Great Lakes and Lake Champlain, and with all the railroad terminals along our eastern coast.

An important step forward in this connection has been the beginning of condemnation proceedings for acquiring the Cape Cod Canal. This was done, pursuant to the act of Congress (Public No. 37, 65th Cong.) approved August 8, 1917, which provided that the Secretary of War, the Secretary of the Navy, and the Secretary of Commerce should examine and appraise the value of the works and franchises of the Cape Cod Canal with reference to the advisability of the purchase of the canal. The Secretary of War was authorized, if all the Secretaries mentioned were in favor of the acquisition, to enter into negotiations for its purchase. The three Secretaries having concurred in a recommendation that the purchase was desirable, the Secretary of War caused condemnation proceedings to be begun on January 30, 1919. Bills are now pending (S. 2083 and S. 862), providing for the acquisition and operation of the canal by the Government, which have been approved by this Department.

It remains to recite the brief but effective service of several branches of the Department's work undertaken during the fiscal year which have ceased to exist.

Industrial Board.

The Industrial Board of the Department of Commerce was organized with a view to expediting the process of commercial readjustment. When it was formed prices were in a state of flux. The general expectation in the business world was that prices were, in the near future, to fall and every one hesitated to purchase lest they should buy upon a falling market.

It was a voluntary organization of business men composed of seven members, three representing, respectively, the Railroad

Administration, the Department of Commerce, and the Department of Labor, and four representatives of industry. Under the then existing circumstances the board undertook to promote general confidence and hasten the revival of trade by securing the voluntary assent of industries to reductions in prices which were to be such, however, as did not involve either reducing the wages of labor or closing down those individual factories whose efficiency was not as great as the larger ones and who were generally known as "high-cost producers."

The board succeeded in obtaining the assent of the steel industry and of other considerable industries, and marked reductions in prices of steel were announced and recommended to the Government purchasing departments. From these recommendations the Railroad Administration dissented, thinking the prices recommended too high. The final refusal of the Railroad Administration to accept the recommendations of the board resulted in the resignation of the board, which ceased to exist on May 9, 1919. The reduced prices which have been arranged with other industries were never promulgated for this reason. Since then the Railroad Administration has purchased (under protest) steel rails at the prices recommended by the board.

Industrial Cooperation Service.

On January 1, 1919, the Industrial Cooperation Service was formed to take over certain peace-time functions of the War Industries Board. Your approval on December 3, 1918, of my request for \$100,000 from the fund for the national security and defense made it possible to carry on this work during the last six months of the fiscal year. While some of the work had been developed by the War Industries Board, it was carried on there in a restrictive and administrative way, while the Industrial Cooperation Service's policy was promotive and cooperative.

Generally speaking, the Service established a focal point in the Government for the discussion of business and industrial problems. As the work progressed the problems fell within well-defined classes; i. e., those concerned with the standardization of products; those concerned with the search for outlets for waste products and the commercial development of new products; and those concerned with plans for minimizing business abuses. It also acted for this Department with other Government departments in the consideration of industrial matters.

The Service was asked in numerous different cases to seek outlets for by-products or waste products of various industries. The most striking example was the development of the uses of cottonseed-hull fiber, hitherto practically a waste product of the cottonseed-oil industry. Three uses for the fiber were developed: (1) As an insulator for fireless cookers, incubators, etc.; (2) as a binder in the manufacture of composition soles for shoes; (3) as a material for making paper.

It also found an outlet for cotton linters, used so extensively during the war. Cooperating with the War Department, the Bureau of Standards of this Department, and the Forest Products Service of the Department of Agriculture, this Service demonstrated that linters could be used to make a good grade of book paper, and a number of mills have started to work along these lines.

At the request of the Secretary of State this Service investigated the possibilities of starting a submarine telegraph-cable industry in the United States. The reports of the Service were valuable in the consideration of the proposed Government trans-Pacific cable, provided for in Senate bill 1651. One of the important duties of the Industrial Cooperation Service was cooperation with business organizations in formulating plans for minimizing what are known as "trade abuses." At the request of the publishers of books and the National Credit Men's Association the "returned-goods" question was studied. The lowest estimate ever made as to the cost to American business of the unjustifiable return of merchandise was \$25,000,000 annually. This loss, of course, is borne by the ultimate purchaser. The Book Publishers' Association's problems were treated to the satisfaction of all concerned. The larger general problem of the unjustifiable return of merchandise had to be dropped in its early stages because Congress did not appropriate money for the continuance of this Service.

In every instance the assistance rendered by this Service was requested by the industry or business concerned and its activities embraced many fields. The Service provided an admirable place in the Government where business men could come and discuss their difficulties and be assured of sympathetic attention. The refusal of Congress to provide the sum of \$56,000 for the continuance of this productive organization necessitated the conclusion of its activities on June 30, 1919.

Waste-Reclamation Service.

Organized to meet a vital war emergency, resulting from a shortage of war materials, the Waste-Reclamation Service rendered very valuable permanent service during its short existence, in beginning the campaign of education necessary to get the American people in the habit of saving the many things that they have been throwing away. Its chief function was that of education, the action resting with the State and subdivisions thereof, as the advantage accrued to them. Through speeches, publications, and specific advice by letter when so requested, and all the other means open in matters of this kind, this Service sought to aid in the reclamation of waste inorganic materials. By the proper disposal of ashes, garbage, etc., by the communities, not only the materials themselves would be made of use again, but there would be a surplus of money receipts that would reduce taxes proportionately.

The system of disposing by public sale of unused war materials, now being used, was suggested by this Service. Through its initiation and efforts a drive was launched, in conjunction with the Treasury Department, for the saving of materials usually destroyed in the annual clean-up campaign, and payment made therefor in Government Thrift Stamps rather than cash. The Salvage Division of New England estimated that \$250,000 worth of Thrift Stamps would be dispersed by this method during the months of May and June.

A new method of handling waste tin cans was also investigated and called to the attention of the country. The old system of handling these cans emphasized the redemption of the tin removed from the can, while the new system deheads the can and uses the tin in a flat form. Besides reducing the cost of handling the cans, this method increases by about 300 per cent the return to the contractor.

As a means of advising other communities how to proceed, the Akron Industrial Salvage Co. (Inc.), a community waste-saving system, was investigated and a report made covering its operation. Over 15,000 copies of the first edition of this publication were distributed in two weeks and several communities were, after looking into the subject, ready to launch similar systems when this Service had to be discontinued.

An investigation of the present means of disposing of waste paper in Government services was made through the courtesy of the Public Printer, and the report, which was published as House

document 87, Sixty-sixth Congress, first session, showed that in the year 1918 the Government should have received at least \$86,869.35 more for its waste paper than under the contract price. The report also made definite recommendations which, if carried out, would secure from \$50,000 to \$100,000 annually additional from this source.

At the request of the Wool Stock Graders' Association this Service released to the press a statement dealing with the value of shoddy and recommended that the interested associations confer with a joint committee to be composed of representatives of the Departments of Agriculture and Commerce, with the idea of establishing tests for the evaluation of woolen fabrics. The interest shown by several organizations established the constructive value of the statement, and steps were taken to organize the joint committee. At about that time the Service had to be discontinued on account of lack of funds.

Tests were being made to determine the method for utilizing old shoes. This problem was pressing, and demanded immediate study, but also had to be discontinued.

A study of the Army system of garbage segregation as a means of elimination of waste in the preparation of food was in the course of preparation. It is believed that the Army system can be applied to all institutions. An American machine used by the British army was being studied with the idea of recommending that a machine of this type be installed in the institutions for the recovery of fat.

A training course for salvage managers had been outlined and one institution was prepared to institute such a course as soon as this Service had developed the field. Plans for the development of an association of salvage managers had been drawn up and submitted to several leaders in this field for consideration.

The refusal of Congress to appropriate \$25,000 in order that this productive work might be carried on necessitated the disbanding of the Service on June 30, 1919. It will be noted that in one item alone—the study of conditions governing the disposal of waste in the Government Printing Office—a saving of from \$50,000 to \$100,000 per annum could have been made, which would have paid the cost of the entire Service for two years.

Introduction of New Fish Food by the Bureau of Fisheries.

It seems most extraordinary that at this time of high prices for all matters entering into the cost of living, and when urgent

pressure is being exerted to add, because of sore need, to the animal food supply of the world, a work which was successfully developing large quantities of unused, nutritious, and cheap foods should be deliberately cut off.

It is, therefore, with deep regret on behalf of many thousands of our population living in crowded centers along the Atlantic, Pacific, and Gulf coasts and on the shores of the Great Lakes, that I saw the refusal of Congress to grant the sum of \$15,000 to maintain the small but effective staff of our persons that have been successfully engaged in the work of introducing new, abundant, and cheap fish foods, available in large quantities, but either unused or little used. Such fishes, for example, as the Pacific mackerel, the ordinary cod, and the so-called black cod, or sable fish, in the same ocean, find as yet a limited market. The same is true of the burbot and the bowfin of the Great Lakes, and of the whiting of the Atlantic. There are many others. It appears to have been the case that this productive work, having begun during the war, was assumed to be strictly war work, whereas the daily evidence to every housewife in the land of the price she must pay for food is itself witness that the continuance of this work is needed.

It is difficult for me to understand the mental processes whereby so small a sum as \$15,000 was refused for so great a work and one that bore so directly upon the homes and happiness of many times ten thousand people who feel the pressure of current prices. The work had received nothing but praise, which was well deserved. Economy of the sort which stops an effort to bring cheap and abundant food to the knowledge of our people, and forces them, without this knowledge, to buy high-priced foods, is of a curious type.

The matter was brought by me personally before the Appropriations Committees of both the House of Representatives and the Senate, and its peculiar importance at this time was urged upon them, but in both cases without success. Feeling, however, that the subject could not have been fully understood, it was brought before the attention of the House of Representatives by a letter dated July 19, 1919, which forms House Document No. 155, Sixty-sixth Congress, first session, and is printed in full, with inclosures, in an Appendix B to this report, in connection with the discussion of another subject. Subsequent to this the matter was again brought before the Appropriations Committee of the House of Representatives by the Commissioner of Fisheries on September 2, 1919. No appropriation, however, has been made.

One is at a loss to understand the reasoning, if it be such, which leads to cutting off three productive services at a time when their results were effectively helping the solution of a concededly difficult situation. The Industrial Cooperation Service was not an expense to the country, neither was the Waste-Reclamation Service, still less the food demonstration work of the Fisheries Service. On the contrary, these three Services produced wealth. The country was the richer for every month in which they operated. The country is poorer for their stoppage. There is less food to-day available because the Fisheries demonstration work has ceased. Products that are valuable are being wasted in great quantities and values because the Waste-Reclamation Service no longer exists. For lack of the Industrial Cooperation Service production now so sorely needed is, in many places, either delayed or hampered or rendered more expensive for lack of the mutual, helpful touch that Service provided. There is no doubt of these facts. They are denied by no one.

The psychology seems to have been that anything that was born during the war was warlike, in its nature unfitted for peace, extravagant. No discrimination seems to have been made in favor of services which, coming into existence during the war, yet were meant for peace. The besom of destruction was laid upon them. They have been destroyed without regard to their productiveness or their advantage to the country.

This, naturally, leads to the suggestion that Congress makes no difference between productive and unproductive services. It does not practically recognize the difference between expenditure and investment. It adds no force, so far as my experience goes, to demonstrate that the money expended in one case produces a direct profit to the Nation as a whole. It is all treated as expense alike. It is all regarded as something to be cut away, if it be possible, and men who have by careful forethought developed services to a self-sustaining basis are discouraged to find that their efforts not only bring no thanks or appreciation, but that, if the facts concerning them are not disbelieved, they are at least ignored.

Just as the system which Congress uses in dealing with unexpended balances is calculated to promote, and does, in fact, promote, the avoidance of such balances by the deliberate spending at the close of the fiscal year of all available balances for any proper use, so the failure to discriminate between productive and unproductive services directly encourages looseness of admin-

istration and leads men to become careless as to whether their work is profitable or not.

The public in no small measure takes its mental cue from the attitude of Congress, reflected through the press, and assumes all Government appropriations to mean expense, and would be surprised to learn the extent to which many of them are profitable investments. The motor-vessel fleet of the Bureau of Navigation, of the Department of Commerce, costs the Government nothing; instead it has turned into the Treasury, through mitigated fines, a sum sufficient to pay the original cost of the motor vessels and their maintenance, with a surplus. The Bureau of Navigation itself gathers, through the medium of the collectors of customs, navigation taxes which far more than cover its entire outlay. The value at current cash prices of the fish rescued by the seining parties of the Bureau of Fisheries from the overflowed ponds of the Mississippi River between St. Paul and New Orleans is more than sufficient to pay the entire expense of maintaining the 52 fish hatcheries of that service and to present their entire work of producing over seven billion small fish and fish fry per annum as a clean gift to the Nation, free of all expense.

In an industrial corporation the outlook is always toward the productiveness of expenditure; in the Government services the productiveness of the expenditure is almost or quite ignored. It may be said, indeed, that the assumption is that all the services are deemed to return their value in work, else they would not be permitted to exist. If this be so, what shall be said in favor of those services which not only do return their value in work, but in so doing return into the Treasury in cash more than their cost of operation? These, under private management, would be deliberately and necessarily encouraged. These, under public management, are, so far as my experience goes, given no special consideration.

BUREAU OF FOREIGN AND DOMESTIC COMMERCE.

(PHILIP B. KENNEDY, *Director.*)

The decisive factor in the work of the Bureau of Foreign and Domestic Commerce during the fiscal year 1919 was the signing, on November 11, of the armistice between Germany and the allied powers. By that event the year was divided into two distinct periods characterized by divergent aims. It may be said with truth that the termination of hostilities in Europe altered, as by an abrupt shock, the aspect of the commercial world and the trend

of all activities in trade promotion. With the achievement of the great goal, tremendous forces were immediately relaxed, recently created mechanisms were divested of their purpose, and the need arose for diverting to new channels the energies that had been devoted to the winning of the war.

While the armies were still struggling on the western front, private interests were subordinated to the national cause. Trade regulations and restrictions that ordinarily would have been considered shackling were met in a spirit of willing sacrifice. Under circumstances such as these the Bureau of Foreign and Domestic Commerce aided in every possible way the war organizations of the Government and recognized that its researches in foreign markets should be considered as preparation for the change that would inevitably come with the laying down of arms.

The conclusion of the armistice produced a striking change. Dangerous sea lanes became safe again. Artificial economic barriers were gradually let down. New States arose, with freedom of entrance for the investigator and the salesman. In Europe "reconstitution" became the potent word. Provinces had been devastated; industries had been wrecked; the whole normal course of existence had been warped or stifled or turned to alien ends. There was the menace of starvation. Stocks were depleted. Machinery that had supplied the wants of millions lay in twisted heaps of useless rubbish. And, for replenishment, the nations which had suffered looked to the United States. Here, then, was a situation representing at once commercial opportunity and social duty. To Europe the Bureau of Foreign and Domestic Commerce has sent many men to study the needs of the people and the best means of satisfying them.

Since the armistice American producers have been free to resume their trade in South America, the Far East, the Near East, and the many countries where the war emergency had involved a slackening of our effort, and a further incentive is given by the urgent desirability of providing new outlets for the manufacturing facilities called into being by the war. As the industries of the war-racked European nations revive—as adjustments are effected and secure economic bases are evolved—those nations will reach out beyond the seas to find markets for their wares.

American exporters will find their path no easy one. They will need the firmest resolve, the most efficient methods, and, above all, the most accurate knowledge. This knowledge it is

the function of the Bureau of Foreign and Domestic Commerce to supply. American producers should not enter new fields in any groping or hesitant way; they must be equipped with information as comprehensive as it is practical, as pertinent as it is sound. In the gathering and disseminating of such essential facts, the Bureau is proving signally useful to American business. Its aim is to stimulate, to vitalize, and, with patience and continuous application, to smooth the way for export trade. It is expanding and driving ahead with a clear comprehension of the object sought. Its present opportunity is remarkable; and it may be expected to respond with effective service.

Unprecedented Totals for American Foreign Trade.

During the fiscal year 1919 new high marks were established for both the import and the export trade of the United States. Imports of merchandise totaled \$3,095,876,582, as compared with \$2,945,655,403 in 1918 and \$2,659,355,185 in 1917. Domestic exports amounted to \$7,074,011,529, as against \$5,838,652,057 in 1918 and \$6,227,164,050 in 1917. Not considering reexports of foreign goods, the visible balance of trade in favor of the United States on merchandise transactions for the year just ended was \$3,978,134,947, a figure never approached in the commerce of any nation in the history of the world.

The exports of domestic and foreign merchandise to the several grand divisions during the fiscal year 1919 were as follows: Europe, \$4,634,816,841; North America, \$1,291,932,342; South America, \$400,901,601; Asia, \$603,924,548; Oceania, \$208,351,493; Africa, \$85,157,432, making a total of \$7,225,084,257.

Letters of Appreciation Show Practical Results Accomplished.

That the services of the Bureau of Foreign and Domestic Commerce have contributed appreciably to the great growth of American trade with all parts of the world is shown by the many unsolicited letters of commendation received—communications telling of large sales effected through the bureau's aid, mentioning the receipt of data satisfying specific needs, and expressing gratification at the essentially practical and productive character of the work performed. And it is to be remembered in this connection that the concrete results brought directly to the bureau's attention doubtless represent only a small fraction of the trade development that may fairly be attributed to its efforts.

Period of Readjustment in Commercial-Attaché Service.

The bureau's commercial-attaché service the past year has undergone a period of readjustment. War work continued up to the signing of the armistice, while immediately thereafter plans were made for the resumption of the normal activities of trade promotion and investigation. The readjustment period, however, brought its own special problems. For example, in Argentina, Brazil, Japan, and Australia the representatives have been busy with the difficulties involved in the sudden arrival of goods far in excess of immediate needs. Through their efforts the situation was handled effectively without loss to importers, exporters, or bankers. In England, France, Italy, Spain, the Netherlands, and Denmark the attachés have had to deal with questions arising out of the relaxation and modification of war-time trade restrictions.

An important development in connection with the commercial-attaché service was the sending out of trade commissioners to conduct general investigations under the direction and supervision of the commercial attachés. Early in the fiscal year Herman G. Brock was sent to London to assist Commercial Attaché Kennedy in carrying on the strictly commercial activities that were necessarily being pushed aside by the war work. Mr. Brock furnished the bureau with timely reports and was also able to assist Mr. Kennedy materially.

Shortly after the armistice the Department of Commerce recognized the necessity for a greatly increased force in Europe to keep in the closest possible touch with important developments and trade tendencies. The President allotted \$200,000 from the fund for national security and defense, and by the latter part of February trade commissioners and clerks were dispatched to Europe.

Ten trade commissioners worked on general investigations directly under the supervision of the commercial attachés. Their investigations covered a wide variety of commercial, financial, and industrial subjects.

Activities of Attachés in Europe.

Coming now to a consideration of the commercial-attaché posts themselves, the London office should be mentioned first. Commercial Attaché Philip B. Kennedy was engaged in war work in addition to the normal activities of his office. Besides handling mineral and tin problems for the War Trade Board and aiding the War Department in the purchase of urgently needed materials, Mr. Kennedy took over during the latter part of the year the entire

handling of the Swedish iron-ore and Norwegian molybdenum contracts, for which the President put at the disposal of the Secretary of Commerce \$6,000,000 from the fund for national security and defense. Mr. Kennedy has cooperated closely with the ambassador and the consul general in the matter of British import restrictions. One of the most important features of the work in London during the year was the cooperation between the office of the commercial attaché and the American Chamber of Commerce in London. The attaché was an ex officio member of the trade information committee, and his office was represented at its weekly meetings. The office in London made first-hand investigations of markets for American products. For example, the possibilities for the sale of American cottonseed-hull fiber were carefully analyzed. Through the commercial attaché American producers of dyestuffs were put in touch with officials of the Italian Government. Mr. Kennedy represented the United States unofficially at the Interallied Parliamentary Conference held in London, July 2 to 4, 1918, and submitted reports upon the deliberations of the conference. During April Commercial Attaché Kennedy returned to the United States to confer with the officials of the bureau and meet business men interested in post-war conditions in England. The customary tour of commercial centers was made and many conferences held. As a result of an invitation extended through Mr. Kennedy to the Chamber of Commerce of the United States in behalf of the Associated Chambers of Commerce in Great Britain, the former body decided to bring to this country in the early fall, for a discussion of industrial and financial reconstruction problems, commercial delegations from the allied nations in Europe. In July, 1919, Mr. Kennedy was appointed Director of the Bureau of Foreign and Domestic Commerce.

Pierce C. Williams accompanied to Paris the War Trade Board representative and, under his direction, organized and operated for several months the American office of the Interallied Contingent Commission and continued to assist, to an extent, in the work of the War Trade Board. He submitted timely and valuable reports on such subjects as French industrial reconstruction, the formation of consortiums and comptoirs, import restrictions, and cooperative selling by American interests. He made an investigation of economic conditions in Switzerland. Mr. Williams resigned to enter private employ, and Chauncey Depew Snow, formerly Assistant Chief of the Bureau, was appointed commercial attaché and took charge in Paris March 24, 1919. Mr. Snow also has kept in inti-

mate touch with reconstruction problems. Tariff questions and changes in import restrictions have been closely followed. The attaché has cooperated with the Rhineland High Commission, the officials in charge of the sale of Army supplies and equipment, and the Supreme Economic Council, as well as with the American Chamber of Commerce. As an example of the tangible results accomplished by Mr. Snow, I may mention the assistance given to individual import applications for American goods, even to the extent of preventing the confiscation of such goods.

At the beginning of the fiscal year Commercial Attaché Erwin W. Thompson was in London, continuing the work with the War Trade Board begun in March. He returned to Copenhagen in July and resumed his intensive study of the Scandinavian and German press. This study and daily contact with commercial and financial men throughout the Baltic region enabled him to furnish authoritative reports on economic subjects. Through one of his reports the United States Shipping Board was enabled to obtain from a Danish factory large Diesel engines urgently needed. Mr. Thompson worked out plans for financing shipments of American cotton and other commodities into the new Baltic countries by a system of dividing up the credits between the American shipper and the Danish institutions in a way that keeps the American shipper always secured by safe shipping or warehouse documents. Other special activities included an investigation of textile substitutes, a study of methods to be used in reconciliation of trade disputes, a survey of Scandinavian sources of supply of foodstuffs and other products for the American Expeditionary Force, and inquiries as to the establishment of an American chamber of commerce in Copenhagen.

During the entire year Commercial Attaché Paul L. Edwards acted as the American representative on the Interallied Trade Committee at The Hague. Mr. Edwards served as the agent of the War Trade Board and the American minister in carrying out the various agreements with the Dutch Government, including the handling of the correspondence with the Netherlands Oversea Trust. During November, 1918, he visited London to confer with allied representatives regarding the various Dutch economic agreements. Several trips were made to Paris to confer with the Supreme Blockade Council concerning blockade administration and the shipping of foodstuffs to Germany under the Brussels agreement. Mr. Edwards also reported on current commercial and financial matters.

Commercial Attaché William C. Huntington spent most of the year in the United States because of the unsettled conditions in Russia. During the early part of the fiscal year he was in Moscow aiding our diplomatic and consular officers. He left Russia in the fall, reaching the United States in November after visiting Stockholm, London, and Paris. In Washington, Dr. Huntington has held many conferences with officials of other Government departments interested in Russia. Besides making numerous addresses, he has organized the Russian division of the bureau.

In the fall of 1918 it was decided to establish a commercial-attaché post at Madrid, and the position was offered to William A. Montavon, who had served in Lima, Peru. After the resignation of Mr. Montavon, Chester Lloyd Jones was appointed and opened his office March 5, 1919. At this post the work has been largely of a trade-promotive character. Mr. Jones has assisted the embassy in connection with our commercial treaty relations with Spain, and kept in close touch with proposed tariff legislation. He secured the revision of discriminating tariff classifications affecting American trade. Our ambassador in Spain has expressed his gratification at the valuable services rendered by Mr. Jones, and has recommended the assignment of additional assistants in the office of the commercial attaché at Madrid. The representations of our attaché were largely responsible for the recent granting to a New York company of the important concession for exploiting extensive potash deposits north of Barcelona. This single achievement is sufficient to justify the maintenance of the attaché's office and the expenditure it involves. Other activities worthy of special mention include assistance to the Liquidation Commission of the Army, cooperation with the American Chamber of Commerce in Barcelona, and special reports on Spanish trade conditions.

The second new post opened during the year was at Rome. Commercial Attaché Alfred P. Dennis reached his post in March, 1919. Through his efforts and those of his assistants, import permits were issued for 8,000 packages of American goods that had been held for six months at Genoa. Among other products, American tractors, shoes, hosiery, tubing, steel, and chemicals were admitted upon the representations of the attaché's office. Mr. Dennis assisted the embassy in obtaining equal treatment for American goods discriminated against in Italian treaties with other nations. He has discussed with the Director of Economic Policy and the Director of Customs questions relating to the

admission into Italy of American products. He has also aided firms seeking to establish themselves in the Italian market.

Results Attained by Far-Eastern Offices.

During the first half of the fiscal year Commercial Attaché Julean Arnold was in Shanghai, serving as chairman of the International Maritime Customs Conference. During Mr. Arnold's absence the office at Peking was in charge of A. W. Ferrin and Paul P. Whitham. In cooperation with a representative of the War Trade Board, Mr. Ferrin initiated negotiations for the sale of 5,000 cars and 100 locomotives to the Chinese Government Railways under a car-trust agreement. Mr. Arnold assisted in the organization of a new American bank in China, as well as in that of a joint Chinese-American bank. As a result of his efforts, equipment for 10 cotton mills was purchased and installed in China. He aided in establishing an American tannery, had a share in the sale of American cars and railway equipment, and aided American architects to obtain contracts in China. American industrial films have been exhibited to acquaint the Chinese business public with American equipment and methods of production. The attaché has worked for the protection of American trade-marks, and has furthered the establishment of an American news service and better shipping facilities to China. With the aid of American consular officers he has prepared a comprehensive handbook of China. Mr. Arnold is now on his way to the United States.

Up to the signing of the armistice Commercial Attaché Frank R. Rutter, at Tokyo, was chiefly engaged with problems arising out of trade restrictions and with the study of industrial and economic conditions. Dr. Rutter left for the United States in December to accept an important position on the staff of the bureau in Washington. James F. Abbott was appointed to succeed him. Since his arrival at his post in March, Mr. Abbott has been renewing contacts in Japan and has been keeping Americans acquainted with commercial developments.

In Australia, A. W. Ferrin, by addresses before commercial bodies and through press contributions, has aided in removing misunderstandings as to American trade methods and ideals. Another important service has been in connection with the amicable settlement of large claims made against Americans by Australian importers. Mr. Ferrin has done excellent trade-promotion work, and substantial business has resulted from his aiding Australians to obtain American agencies.

Work of Attachés in Latin America.

The office at Buenos Aires was largely occupied with war work. Commercial Attaché Robert S. Barrett was also the representative of the War Trade Board and the Shipping Board. Mr. Barrett obtained the cooperation of the commercial representatives of the allied Governments and organized a committee, of which he was elected chairman, to take joint action on all enemy-trade matters. He also suggested and assisted in the organization of the Allied Chamber of Commerce of Buenos Aires. To the Shipping Board Mr. Barrett made important and exhaustive reports. During the shipping strike he rendered notable service. Mr. Barrett also devoted considerable time to trade promotion. Largely through his efforts, the United States Chamber of Commerce in Buenos Aires was organized. Many representatives of American firms were assisted, and in one instance an initial order of \$100,000 worth of rubber goods was secured. Mr. Barrett made frequent and extensive reports on timely subjects. He resigned April 1 to enter private business, but returned to the United States and spent three months conferring with business men before his resignation was accepted. Dr. Julius Klein, who had served as chief of the bureau's Latin American division, was appointed commercial attaché at Buenos Aires.

J. E. Philippi was appointed commercial attaché at Rio de Janeiro, arriving at his post November 3, 1918. He has devoted considerable time to a unification of the American commercial organizations in Brazil into an effective body, the American Chamber of Commerce for Brazil. The organization, with the aid of Mr. Philippi, has assisted in negotiations concerning arbitration of commercial disputes. The attaché has made a close study of the Brazilian tariff. Following the armistice unusually heavy import shipments were received, and in many lines stocks were largely in excess of immediate needs. The attaché was instrumental in working out plans for handling the situation without loss to the parties interested. Mr. Philippi has kept the Department informed with respect to shipping facilities, freight rates, etc., has submitted many valuable reports on other important subjects, and has aided in various ways American exporters.

During the greater part of the year the office at Lima, Peru, has been in charge of Robert E. Hurd, secretary to the commercial attaché. Mr. Montavon returned to Washington in October to confer with exporters. However, Mr. Montavon decided while in

this country to accept an important place with a private organization. His trip through the United States was highly successful. While at Lima the attaché was chairman of the subcommittee of the Allied Conference of Ministers that considered war-trade problems. After the departure of the attaché, Mr. Hurd continued these activities, acting as secretary for the organization.

Usefulness of Attaché Service Clearly Demonstrated.

The commercial attachés in South America have submitted special reports on the openings for American marine-insurance operations, markets for drawing instruments and architects' supplies, and German competition in all its phases. The attachés at Copenhagen, The Hague, and Paris have studied the status of the German dye industry. Our representatives in Paris and Rome were able to assist the important commissions representing the National Industrial Conference Board and the World Cotton Conference, while the London and Paris offices were of similar assistance to the commissions representing the shoe and leather trades and the Merchants and Manufacturers' Board of the Cleveland Chamber of Commerce. The attaché service created interest in the exhibition held in Philadelphia in June under the auspices of the National Association of Hosiery & Knit Goods Manufacturers.

A striking example of the usefulness of the service is found in its cooperation with the United States Sugar Equalization Board, which asked the bureau whether the attachés could assist in opening up foreign markets for sugar. The attachés were instructed to give the matter publicity as well as take it up directly with foreign importers. Soon the export demand became so heavy that the board found it necessary to restrict the exportation of sugar.

As another example of the utility of the service, I may mention the cooperation of the Bureau with the Bureau of Markets of the State of South Dakota in finding markets for range horses in Europe.

Vital Work Accomplished by Trade Commissioners.

The division of foreign investigations has aided the war activities of such organizations as the War Trade Board, the War Industries Board, the Council of National Defense, the Shipping Board, and the War Department. Trade Commissioner Axel H. Oxholm rendered important services in connection with the inspection of timber for the American Expeditionary Force. Trade Commissioner Norman L. Anderson kept closely in touch with matters

of interest in the Scandinavian countries, Finland, Germany, and elsewhere. Nels A. Bengtson, trade commissioner at Christiania, cooperated with special representatives of the War Trade Board in Norway.

The lumber investigations conducted by Trade Commissioners Axel H. Oxholm, Roger E. Simmons, Nelson C. Brown, and John R. Walker were practically completed at the end of the fiscal year, and their reports will appear shortly. Upon returning to the United States, each of the investigators made a tour of the principal lumber centers, giving first-hand information concerning the results of his trip abroad. Great benefit will unquestionably be derived from the personal suggestions of the commissioners, as well as from the material in the forthcoming monographs. The regions covered in the investigation were Finland, Sweden, and Norway; Russia and Siberia; the Spanish Peninsula, Italy, and Greece; and Great Britain, France, Belgium, and the Netherlands.

The year witnessed the completion of the field work in the investigation of South American furniture markets by Harold E. Everley and the publication of his book entitled "Furniture Markets of Chile, Peru, Bolivia, and Ecuador." His reports on the east-coast countries will soon appear.

Trade Commissioner W. W. Ewing finished his study of the opportunities in South America for the sale of American construction materials and machinery. A bulletin was published embodying the information that he gathered in Chile, Peru, and Ecuador, and reports on Argentina, Bolivia, Uruguay, and Brazil are being prepared.

Charles C. Hanch conducted a short investigation of the automobile situation in England and on the Continent of Europe.

"Jewelry and Silverware in Cuba" represented the first tangible result of the investigation by Samuel W. Rosenthal into the Latin American markets for the articles indicated. Various other monographs are soon to be published.

Trade Commissioner J. W. Sanger finished his study of advertising methods and conditions in the Latin American countries. His reports are most pertinent and interesting.

Oliver M. Smart has returned to the United States with valuable data on the market for electrical goods in Italy.

During the past year William M. Strachan investigated the production and exportation of certain tropical products in Central America and Colombia, at the request of the United States Shipping Board.

Henry Wigglesworth made a short survey of the general situation in the chemical industries of Europe.

There is now in press a monograph on "Electrical Goods in Argentina, Uruguay, and Brazil," written by Trade Commissioner Philip S. Smith to complete the series resulting from his South American investigations.

The other specialized investigations completed during the year include those of W. G. Marshall on industrial machinery in Italy; H. Lawrence Groves on agricultural machinery in France; Charles P. Wood on industrial machinery in France and Belgium; and Arthur N. Young on financial conditions in Spain.

Trade Commissioner Edward F. Feely made a survey of general commercial and economic conditions in Mexico and has now been appointed commercial attaché at Mexico City.

Louis E. Van Norman was appointed trade commissioner to investigate general trade conditions in Rumania and was stationed at Bucharest for about six months. Having obtained important data on fundamental economic factors, he has returned to this country to give American business men the benefit of his observations.

Leslie C. Wells was assigned to the party of the French Institute in the United States that has been making a tour of France, including the devastated regions.

Among other general investigations should be mentioned those of Nels A. Bengtson in Norway, Harry T. Collings in Belgium, and Eliot G. Mears in Greece. Mr. Mears has been ordered to proceed to Constantinople, to report on general commercial and economic conditions. Mr. Bengtson and Mr. Collings are returning to the United States. General investigations that are continuing as the fiscal year ends are those of P. L. Bell in Colombia and Venezuela, John A. Fowler in the Dutch East Indies and Straits Settlements, Vladimir A. Geringer in Czechoslovakia, and R. A. Lundquist in South Africa. Upon the completion of his work in South Africa (including the preparation of a report on the electrical-goods trade), Mr. Lundquist is expected to proceed to India to study the market for electrical goods in that country.

William L. Schurz was appointed trade commissioner in February to make a general investigation in Bolivia and Paraguay. No trade commissioners have been located in those countries before, though short visits to the principal centers have been made by several commodity investigators of the bureau.

Special investigations now in progress include those of J. Morgan Clements of mineral resources in China; Courtenay De Kalb of mineral resources in Spain; L. S. Garry of textiles in South America; Harry F. Grady of financial conditions in England and on the Continent; Norman L. Hertz of leather in Europe; Alexander Luchars of machine tools in England and on the Continent; W. H. Rastall of industrial machinery in the Far East; Paul P. Whitham of transportation and port facilities in China.

District and Cooperative Offices.

As with other branches of the bureau's activity, the work of its district and cooperative offices during the past year falls naturally into two divisions—that performed before the signing of the armistice and the work undertaken subsequent to that date.

While the actual handling of export and import licenses was taken out of the hands of the district and cooperative office managers some time before the beginning of the past fiscal year, a great many requests and inquiries continued to reach these offices with respect to the war regulations of this country and of foreign nations. It is estimated that approximately 25 to 35 per cent of the time of the employees of these offices was taken up in furnishing information of this character and in advising business men as to the proper procedure in complying with these war-time regulations while still conducting as much foreign trade as possible.

After the armistice, the urgent demands from American business men for advice and assistance in relation to the new markets taxed severely the limited personnel of the bureau's branch offices. Manufacturers and exporters have, for the most part, expressed deep appreciation of the manner in which their requests were handled.

Probably the most notable feature of the work of these offices after the signing of the armistice was the arrival in this country of a comparatively large number of foreign business men desiring to be placed in touch with American merchants. This is a service for which the district offices are peculiarly fitted, each office manager being in close contact with the business interests of his district and being able, therefore, to place foreign buyers in direct communication with firms which can supply their requirements.

Another feature of the work that has developed greatly during the past year has been the investigation of complaints made against American firms by foreign dealers. In such abnormal conditions as those prevailing during the war it was inevitable

that misunderstandings and mistakes should occur. The district and cooperative offices of the bureau have been eminently successful in adjusting these difficulties amicably and without recourse to legal procedure. The effect of this work upon foreign good will toward the United States is evident.

Work in Connection with Latin America.

June 30, 1919, marked the end of the busiest and probably the most useful year in the history of the bureau's Latin American division, organized in 1916 for the general purpose of promoting American trade with all countries and colonies in the Western Hemisphere to the south of the United States. During its comparatively short existence a large quantity of economic information has been accumulated, the development having been especially rapid subsequent to the entrance of the United States into the war. Like all public and private institutions, the Latin American division has found the fiscal year 1919 composed of two distinct phases—that from July 1, 1918, until the signing of the armistice on November 11, and that after November 11, 1919.

Early in the war the division was called upon to cooperate actively in many aspects of war work involving Latin American affairs. About 50 per cent of the time of the division during the duration of the war was given to the preparation of economic material for war uses and to assistance rendered to investigators from other Government offices. In some instances the war organizations found it necessary to maintain in the division members of their staffs on full-time work. The four offices of the War Department maintaining closest contact with the division were the military intelligence branch, the air-craft procurement division, the gas-defense service, and the Surgeon General's Office.

The division was in particularly close touch with the Shipping Board because of the necessity for careful study of ship service to Latin America with a view to curtailing that service to a minimum in order to supply tonnage for trans-Atlantic troop and munition movements. The files of the division were used as the foundation for data relating to such questions as Mexican petroleum, Latin American merchant marine, fuel supplies of South American countries, interned German shipping in Latin American ports, and Japanese ship movements to South America.

The division was called upon constantly by the War Trade Board for advice on the granting of licenses for exports to Latin America, with special reference to the actual necessity for the

given commodity in the consuming countries. As the board undertook to establish its own field service, its various appointees were given special preliminary training in the Latin American division before departing for their posts in the southern countries.

The division furnished to the Food Administration a number of comprehensive tabulations relating to the trade in sisal fiber, sugar, bananas, coffee, and cereals.

Aid was given to the Geological Survey in its investigations of the Latin American supplies and the proprietary control of such minerals as nitrate, petroleum, coal, tin, zinc, manganese, platinum, antimony, and tungsten.

For the Federal Reserve Board members of the division wrote brief treatises covering the effects of the war on exchange in Brazil, Uruguay, Argentina, and Chile.

Data and suggestions were supplied to the Committee on Public Information.

Investigations were conducted regularly for the Foreign Trade Adviser's office of the State Department.

The division also cooperated in collecting economic data for use at the Peace Conference. Numerous reports were prepared for this use.

While the time of the Latin American division was primarily occupied with the war activities above enumerated, prior to the signing of the armistice, the work of supplying trade information to private interests was not neglected. It was often called upon to act as a mediator between private business and the Government war organizations.

The revolution in commercial activity that took place after the cessation of hostilities was reflected in the work of the Latin American division. Manufacturing industries turned to foreign markets as outlets for their production. The average number of letters of trade information written weekly by the division, in response to inquiries received from business houses, increased from 89 in July, 1918, to 220 in April, 1919. The number of visits by export managers, salesmen, and officials of manufacturing firms and export houses grew to 35 or 40 per week.

One of the most encouraging features of the trade-promotive work of the Latin American division has been the regularity with which its services have been used by business institutions recognized as among the most important in the United States. Among them may be mentioned practically all the American banks that

have branches or affiliated houses in Latin America, the more prominent steel companies, many of the strongest export and import houses, investment and financial institutions, and many others among the leaders in their respective industries, such as textiles, chemicals, paints and varnishes, jewelry, rubber, motor cars, agricultural implements and machinery, industrial equipment, railway supplies, electrical manufactures, explosives, timber, hardware of all kinds, construction materials, foodstuffs, and, in lesser volume, practically every variety of manufactures.

So far as has been practicable in view of the time necessarily occupied by work of more immediate importance, the division has prepared, on subjects of timely interest, articles involving original research. These reports, to which the name of "Latin American circulars" has been given, were issued during the past year at intervals of approximately two weeks and have been published in Commerce Reports. The series has included reports on the trade balance and foreign exchange of Uruguay and Brazil; railways and railway development in Mexico, Brazil, Peru, and Argentina; petroleum and general trade conditions in Mexico; studies of paint and varnish and automobile markets; and other miscellaneous subjects. A gratifying appreciation of this phase of the division's work has been evidenced not only by personal letters but also by the reprinting of such studies in trade journals and the daily press.

During the last weeks of the year the division prepared a complete syllabus for the use of instructors in Latin American trade courses and of students who desire to pursue such study independently. This work comprises four courses on the main divisions of Latin America, including preliminary references to the history and social heritage of each nation as well as a review of the physical features, transportation, native products, banking and finance, and economic characteristics peculiar to the region under consideration. Commodity studies based mainly on the official reports published by the Bureau of Foreign and Domestic Commerce form the practical end of each course. This syllabus will be embodied in a bulletin to be issued by the Federal Board for Vocational Education about the first of September, 1919.

Promotion of Trade with Far East.

The Far Eastern division accumulates and distributes trade information in a variety of ways. It clips and files all pertinent articles appearing in about 20 representative Far Eastern trade

papers. In order to insure as extensive a circulation as possible for data of this character, a weekly digest of the clippings is made and published in Commerce Reports. These "press notes" are widely copied in trade and news papers throughout the United States. The value of thus directing intelligent inquiry is manifest; it discourages the old type of "dagnet" inquiry that is so difficult to handle and, with more beneficial results, excites the interest of merchants and manufacturers in available material of a specific nature. Lists of selected titles, from the clipping files and the card index of articles in periodicals, are distributed to the bureau's district and cooperative offices.

The duplicate replies of consuls to trade inquiries are filed in the Far Eastern division, and their gist is summarized on cards. Letters of special interest form the nucleus of articles in Commerce Reports, under the heading "Far Eastern trade notes." For Commerce Reports, also, the division prepares summaries of forthcoming monographs by the field investigators of the bureau.

Special lines of investigation for commercial attachés and trade commissioners are suggested by the division, based upon inquiries received from American sources.

The division is assembling a library of great practical value. Yearbooks, directories, studies of economic conditions, official reports of foreign Government departments and bureaus have expanded the bookshelves from 4 to 15 sections.

In the distribution of the information thus accumulated probably two-thirds of the effort has been expended in answering individual inquiries. These have increased from about 25 per week in July, 1918, to more than 125 per week at the termination of the fiscal year. In a surprisingly large number of cases the division has been completely successful in supplying the exact data required.

It was early discovered that there was a steady call for comprehensive surveys of the Far Eastern markets for certain articles entering largely into the export trade of the United States. To meet this demand, 18 circulars discussing the opportunity for such goods in practically all important Far Eastern markets have been prepared and given wide circulation through Commerce Reports and by mailing to a special list comprising virtually all the American manufacturers and exporters actively engaged in trade with the Orient. These circulars have had gratifying results.

The miscellaneous activities of the division during the year have been numerous and exacting. It was called upon for advice con-

cerning the desire of the Chinese Government to purchase railway equipment. It gave attention to the bill introduced in Congress for the incorporation under Federal law of companies engaged in foreign trade exclusively. The subject of better cable facilities across the Pacific was taken up. At the request of the Shipping Board, the division suggested two routes for transpacific steamship service, the accumulation of the necessary data involving much research. The division has been called upon frequently to clear up trade disputes of a peculiarly aggravated nature. A number of addresses before trade bodies have been made by members of the division.

Establishment of Russian Division.

Among the important undertakings of the bureau during the fiscal year was the organization of a Russian division, under the direction of Dr. William C. Huntington, commercial attaché to Russia. Dr. Huntington was in Russia during the last days of the imperial régime and the entire period from the revolution of March, 1917, to the withdrawal of the American diplomatic representatives.

The Russian division was organized in January, 1919, the staff consisting at first of only the chief and a stenographer. Two additional persons were engaged in March, and since April the work has been very actively carried on. The aim of this work is (1) to make a thorough study of Russia and to build up a collation file of sound, tested information, as well as to form a good library; (2) on this basis to furnish accurate information to business interests; and (3) to form a center for all sorts of American-Russian trade relations.

Numerous articles and translations prepared by the division have been published in Commerce Reports. Russian currency, mineral resources, the flour-milling industry, the beet-sugar industry, the market for textiles and clothing, the port of Archangel, the resources and trade possibilities of Poland, etc., have formed the subjects of such reports.

Many business men, both Russian and American, have visited the division. The cooperative societies and their projects have occupied much time. A large number of inquiries have been answered relative to general conditions in Russia and Siberia, as well as special branches of trade and manufacture. About 300 of these letters have been in the nature of real reports to the inquirers.

The division has endeavored to obtain publications from all sources and has worked in close cooperation with other divisions of this Department and also with the Department of State, the Department of Labor, the Shipping Board, and the War Trade Board. It has worked with the military intelligence division of the War Department.

The division has cooperated effectively with such organizations as the American-Russian Chamber of Commerce, the Russian-American Committee for the Far East, the Russian Embassy, the consulate general of the Republic of Poland, the Russian Economic League, the National City Bank of New York, the National Bank of Commerce, the National Association of American Manufacturers, and various chambers of commerce. Attempts have been made to get in touch with chambers of commerce abroad, in Harbin, Omsk, and Archangel. Arrangements have been made with the State Department to obtain periodically data from representatives in the United States of States organized from portions of the former Russian Empire.

It is confidently believed that this new Russian branch of the bureau's activity will contribute very substantially to an understanding of the Russian problem, aiding Americans to take advantage of an ultimate opportunity for the utilization of capital and the supplying of merchandise to 180,000,000 people.

Extraordinary Demand for Commercial Information.

The bureau's division of trade information, which supplies, through correspondence and personal interviews, data on foreign markets other than Latin America, the Far East, and Russia, sent out approximately 45,000 communications during the past year. Since the signing of the armistice the facilities of the division have been taxed to meet the truly phenomenal demand for commercial information. Upon the cessation of hostilities American manufacturers whose establishments had grown as a result of war orders began to seek means to keep their plants and organizations intact, and thus avoid the unpleasant task of reducing their forces and curtailing production. The inquiries received by the bureau show that a remarkably large proportion of these concerns have turned to foreign trade as a solution of their problems.

In connection with its trade-promotion work the bureau maintains close cooperative arrangements with the principal commercial organizations throughout the United States. An important supplemental publicity is thus given to the bureau's publica-

tions and special services. In turn, the division of trade information is often able to be of definite assistance to such associations and their individual members. It is called upon frequently by newly established associations, planning the organization of foreign-trade departments, for advice and constructive suggestions that will assist them in initiating, developing, and carrying on a special service of this kind.

Division of Statistics.

During the first half of the year the efforts of the division of statistics, aside from the regular work of preparing the statistical publications, were directed mainly toward furnishing the special war bureaus with the detailed foreign-trade statistics required by them.

The various divisions of the United States Shipping Board made probably more extensive use of the statistics than any of the other war offices. As a basis for the control and allocation of ships for imports of essential war materials for which the United States was dependent upon foreign sources, the division of planning and statistics of the Shipping Board was supplied regularly with reports of imports during 10-day periods. The port and harbor facilities commission of the Shipping Board made extensive use of the monthly reports showing imports and exports of each customs district by articles and countries. The division of operation made extensive use of the bureau's reports of "Vessels entered and cleared in the foreign trade," while the division of trade was given aid in the construction of tables showing commerce in leading staple articles by ports and countries.

The Food Administration and the Bureau of Markets of the Department of Agriculture were furnished with 10-day reports of imports and exports of foodstuffs and agricultural raw products.

The several divisions of the War Industries Board and the Council of National Defense made constant inquiries for foreign-trade statistics in connection with their work of priority rulings, price fixing, and other war restrictions, and received numerous special monthly and 10-day statements.

The Geological Survey, the Bureau of Mines, and the interdepartmental War Minerals Committee were kept regularly supplied with the latest statistics on imports and exports of non-ferrous metals, coal, mineral oil, nitrogenous materials, and other essential minerals.

The War Trade Board made constant use of the import and export statistics, its bureau of research being regularly furnished with copies of the 10-day and monthly export reports, and every facility was afforded its officials to keep their statistical records up to date. Numerous special tables were also furnished to that board.

Among the other Government establishments to which information was supplied by this division were the Central Bureau of Planning and Statistics, the Committee on Public Information, the Alien Property Custodian, and the Director General of Railroads. In many cases extensive research and compilation were required.

Since the signing of the armistice this extensive use of the bureau's foreign-trade statistics has gradually diminished, so far as the war boards are concerned, while there has been a corresponding increase in the demands by private industries and commercial organizations. It is the policy of the division to furnish as complete statistics as possible bearing upon the inquiries submitted.

For several years the division has maintained a limited service of special monthly statements to certain parties, giving more details than the published reports. It was decided to extend this service by furnishing it to such trade journals and commercial organizations as would agree to give publicity to the statements. The demand has exceeded all expectations. The work was started with statistics for December, 1918. After it had been in operation for six months, 1,178 copies of 81 statements of imports and exports during May, 1919, were furnished to about 300 different addresses, mostly those of trade organizations and commercial journals.

Special arrangements have been made with local correspondents of trade publications by which they are given access to the copy for the Monthly Summary before it is sent to print. Thus the figures of imports and exports in the principal lines of industry—including, among others, automobiles, textiles, iron and steel, and hides and leather—appear in the trade journals a week or more in advance of the official statistical publications.

The Department of Commerce is aware of the importance of promptness in the statistical service and is giving much attention to the coordination of the bureau's work with that of the Customs Service of the Treasury Department, through which the reports are collected. In recent months there has been a notable improvement in this regard.

An act of Congress approved January 25, 1919 (S. bill 4924), amended section 336 of the Revised Statutes by requiring that the annual report shall be issued to cover the calendar instead of the fiscal year, because of the greater demand for figures relating to the former period. For 1918 the bureau undertook to prepare, in addition to the fiscal-year report, an annual report on the Foreign Commerce and Navigation of the United States for the calendar year. In order to provide a continuous record for the intervening period between the fiscal and calendar years, the figures for the half year from July 1 to December 31, 1918, are shown in all of the tables in addition to the calendar-year figures.

Steps are being taken to change the tables in the foreign-commerce section of the Statistical Abstract from fiscal to calendar years.

The usual publication Trade of the United States with the World, showing imports and exports in the trade with each foreign country by articles, was brought up to date for 1918 and issued as Miscellaneous Series No. 78. A special compilation was made and published in Commerce Reports of the imports into and domestic exports from the United States during the calendar year 1917, stated in the terminology of the international classification agreed upon at the International Statistical Congress at Brussels in 1913.

To remedy the lack of detail in the foreign-trade statistics, a revision and extension of the export classification was undertaken in the latter part of the fiscal year. An interdepartmental committee was appointed, comprising representatives of the Treasury, Agriculture, and Commerce Departments, the Shipping and War Trade Boards, and the Tariff Commission, for the purpose of preparing an entirely new classification applicable to both imports and exports. It was decided that the present alphabetical arrangement should be discarded and that the commodities in the new classification should be grouped in 10 great classes according to their character, the origin of the component materials rather than their use being the guiding principle in classifying. Each of the 10 main groups is to be divided and subdivided into subsidiary groupings, the decimal system of numbering being used in order to facilitate mechanical tabulation and to provide elasticity for future expansion. Comparability between imports and exports is to be preserved, but in cases where the imports or exports are not of the same importance for certain groups the classification

need not be shown in the same detail. Quantities are to be shown in all cases either in standard commercial units or in weights.

Trade organizations and experts have prepared detailed schedules for their particular lines. The arrangement and condensation of the various classifications submitted has proved a huge task. It had been planned to put the new classification into effect on January 1, 1919, but this was found impracticable, and the work has continued uninterruptedly up to the present time. It is expected that January 1, 1920, will be the effective date, unless some now unforeseen event should make further postponement necessary.

Original Research and Compilation of Foreign Statistics.

In the research division of the bureau there were prepared during the year, in addition to the Statistical Abstract of the United States and the annual pamphlet on wholesale prices, special publications on Statistics of German Trade, Statistics of Austro-Hungarian Trade, International Trade in Footwear, and International Trade in Cement. The two reports on the commerce of the central Empires have proved of great value to students of their economic development, as well as to business men who are interested in the markets formerly supplied from Teutonic sources. Studies are in course of preparation covering the international trade in cotton goods, motor vehicles and bicycles, horse-drawn vehicles, agricultural implements and machinery, paper and its manufactures, electrical goods and machinery, and manufactures of leather other than boots and shoes.

The research division prepared the statistical tables for the bureau's monograph on Economic Reconstruction in European Countries.

In order to assist in placing American oversea trade on the firmest possible basis, one of the experts of the research division, during the last half of the fiscal year, has paid special attention to the possibilities of employing American capital abroad. In the Far East and Latin America are great resources that have scarcely been touched, and it is believed that this branch of the bureau's activity will conduce very materially to the profit of American financiers and merchants.

Division of Foreign Tariffs.

During the past year the publication work of the bureau's division of foreign tariffs had to be largely subordinated to the rapidly

growing correspondence, dealing primarily with the great number of foreign restrictions on commerce. The increase in the division's mail was particularly noticeable after the armistice, reaching a monthly average of nearly 1,000 letters, compared with an average of less than 250 during the preceding year. Inquiries regarding foreign rates of duty were comparatively few. The foreign import restrictions, on the other hand, formed a very serious obstacle to export trade, and it required a considerable amount of ingenuity and diplomacy to get the average exporter to see the broader problems of exchange, international commercial policies, and national interests involved in the import prohibition on the particular article in which he was interested.

The work of the division in connection with foreign trade-mark legislation, and especially the examination of official publications with a view to detecting attempts to pirate American trade-marks, has been considerably extended and has resulted in a number of very desirable new connections among American firms. The division has also succeeded in aiding American firms to recover trade-marks that had been appropriated by their agents.

The question of the expansion of American parcel-post facilities with foreign countries has figured rather prominently in the work of the division, which has kept in close touch with the activities of the Post Office Department along those lines. It is gratifying to note that the economic importance of parcel post is receiving increased recognition and that parcel-post service to a considerable number of countries has been inaugurated during the past year.

Editorial Division.

Up to the time hostilities ceased there was so pronounced a shortage in incoming reports from the bureau's field staff that for a time the editorial division seemed confronted with the inevitable necessity of reducing the size of Commerce Reports. But within a month after the armistice was signed there were so many reports in hand that the facilities of the division and of the entire bureau were taxed to give them proper distribution.

The work performed in the division during the year amounted to approximately 12,800 printed pages, as compared with 10,872 pages during the preceding year. Fourteen monographs were prepared for publication in the Special Agents Series and 12 in the Miscellaneous Series. The number of pages in Commerce Reports jumped from 4,912 in 1918 to 5,760 in 1919, the increase occurring during the last six months. The number of foreign-trade oppor-

tunities published in this daily paper increased from 806 for the first six months of the fiscal year 1919 to 1,897 for the six months just closing. An increase of more than a thousand in the paid circulation of the paper has also taken place.

A new series of publications, designated Industrial Standards which will give substantial aid in trade promotion with Latin America, made excellent progress during the year. The first 62 numbers in the series have been issued. They are bilingual editions, in Spanish and English, of standard specifications of the American Society for Testing Materials. This work will be continued during the current year by the translation of these specifications into French and the publication of French-English editions for distribution in the several countries of Europe where that language is used. It is also planned to publish a bilingual edition, in French and English, of the Standardization Rules of the American Institute of Electrical Engineers.

Recommendations.

1. The commercial-attaché service has, during the four years that it has been established, amply proved its value. There has been a distinct field to be filled by men with broad economic and business training devoting their entire time to the important problem of promoting American commerce abroad. Commercial attachés have in almost every instance been of continued assistance to the embassies and legations to which they have been attached, because important commercial questions have been constantly coming up where the advice and assistance of a trained man were of great value. It can further be said that commercial attachés have constantly been of assistance to other departments of our Government which have sent important official representatives abroad. Commercial attachés have turned their hands to whatever task of a commercial character was at hand to do. At the same time constant assistance has been given to visiting American business men who have been endeavoring to enter new markets and to organize their business along sound lines. The commercial attaché has been a commercial counselor of high grade whose service has been found so useful that his time and energy have been taxed to the utmost. It is in accordance with proved usefulness that I strongly recommend the extension and improvement of this service. The kind of men who are useful for this work can obtain large salaries in the employ of American companies engaged in export business, as evidenced by the fact that

commercial attachés have been lost again and again on this account. After an official of this class has the advantage of several years' experience it is a distinct loss to the Government to have him leave and to have to put in a new man. The responsible nature of the commercial attaché's work and the high-grade men required make it necessary to pay higher salaries than we have been able to do. It is also necessary to provide more clerical assistance than has been permitted under the organic law. I recommend substantial increase in the appropriation for the commercial-attaché service.

2. Under the general head of "Promoting commerce" come the special investigations made by trade commissioners, the functions of the district offices, and other work of similar character. It has been possible to obtain high-grade specialists to make investigations in specific lines. Reports and monographs which have been published at regular intervals have been utilized to a great extent by the different trades. This is a work which I feel should be continued. The district offices, established in principal cities, have come to be focal points for foreign-trade information and have done splendid work in making available a large amount of commercial information received from American representatives abroad. These offices are in need of larger staffs and higher salaries. Again and again district office managers who have done excellent work have been given positions with private firms at higher salaries.

3. The Latin American, Far Eastern, and Russian divisions have coordinated commercial information relating to their respective territories and have made it available to American exporters. This specialized service has met with an excellent response. It is a kind of work which I believe should be extended.

4. It is important that the Bureau of Foreign and Domestic Commerce should have an adequate sum for post allowances to be granted to its representatives abroad to offset unusual high cost of living charges and uncertain conditions prevailing at the present time in different countries. The wisdom of granting post allowances has been demonstrated in the case of the American diplomatic and consular service under the Department of State.

5. The Bureau of Foreign and Domestic Commerce distributes to the American business public not only information received from its own representatives abroad but also a large amount of valuable commercial intelligence which comes in from American diplomatic and consular officers. During the present period of

international trade adjustment it is important to have frequent reports to indicate changes which are constantly occurring. This current commercial information should be transmitted to interested American exporters without delay. The statutory staff of the Bureau of Foreign and Domestic Commerce is the medium through which this information must pass. With an unprecedented amount of valuable information to distribute and a greatly increased demand on the part of the public for information of this character, the strain placed upon the statutory staff of the bureau has been very great. It is necessary to have an increased clerical force and also added provision for competent administrative officers. The salaries in the bureau in Washington have not been sufficient to hold highly trained men, who have left the service to enter private employment.

6. The international trade situation is to-day a matter of vital importance to the prosperity of this country. It is essential that the most authentic information about foreign markets be obtained and distributed. In order to do this work effectively, sound constructive plans should be made. Men trained in foreign investigation and in the analysis of foreign-trade conditions are to-day in very great demand in private business. The Bureau of Foreign and Domestic Commerce has been to a considerable extent a training school for men who have later obtained important positions with private companies. It is my opinion that the time has come when sufficient means should be provided so that the foreign-trade service of our Government, represented by the Bureau of Foreign and Domestic Commerce, may be placed on some permanent self-supporting basis, so that accumulated experience may be retained. The service of the Bureau of Foreign and Domestic Commerce deserves to be given increased appropriations necessary to enable it to carry on successfully the valuable work which it is attempting to do.

NATIONAL BUREAU OF STANDARDS.

(Dr. S. W. STRATTON, *Director*.)

The National Bureau of Standards is organized in nine scientific and technical divisions, the office, the mechanical plant, and the technical shops—88 separate sections in all. The bureau's staff during the year included 1,150 employees. The scientific library has 17742, volumes, chiefly in physics, chemistry, and the special technologies, and 442 scientific periodicals from all parts of the world are currently received. There are 13 principal laboratory

buildings, connected by service tunnels, and the equipment includes a liquid-air plant, a refrigeration system, power plant, gas and electric generators, and a system of technical services, such as time signals, electric current, gas, steam, compressed air, vacuum refrigerating brine, and others which are connected to the various laboratories. The bureau also has woodworking shops, instrument shops, a glass-blowing and a glassworking shop, and a well-equipped photographic laboratory.

The transition from war to peace brought special problems of reconstruction of work in the face of reduced funds, and many resignations, aggregating 378 (exclusive of 1,127 separations of a temporary character). To maintain the staff, 1,909 appointments were made. Certain military researches were continued because of their permanent value to the Army and Navy. Researches for other departments and for the industries—deferred somewhat during the war—were resumed, and peace programs of industrial research were taken up vigorously. Estimates were submitted to Congress for this industrial work.

The scientific and technical knowledge derived from researches and investigations is disseminated through printed publications, 51 of which were issued during the year, comprising 36 new issues (12 scientific papers, 15 technologic papers, 6 circulars, and 3 miscellaneous publications) and 15 revised editions. A descriptive list of publications was issued, in which there is given a brief technical abstract with each title, which, with a subject index, makes it specially useful to experts interested in any of the bureau's varied fields of work. In addition, the bureau issues a series of monthly technical news bulletins, in which during the past year 426 separate topics were treated, thus giving promptly summary news notes of the bureau's researches. An important function of the bureau is to make quickly accessible the results of new scientific researches.

Weights and Measures.

During the year, in its new circular on the measurement of mass, the bureau announced new standards of construction and accuracy for weights. This type of service in the interest of national uniformity is of great value to science and industry. The bureau also certified weights, giving corrections for each, so that fairly accurate weights may give very accurate results when the certified corrections are applied.

In the bureau's weighing laboratory 2,594 weights and 36 balances were standardized. Many interesting problems were handled, new methods of determining the weight of a bushel of wheat from samples, verification of standard grain testers, errors in weights caused by brittle lacquer, and the discovery that atmospheric humidity seriously affected the behavior of the bureau's new precision balance for assay weights.

In a larger way the bureau standardized mine scales and railroad track scales, using its traveling test cars, each equipped with weights totaling 100,000 pounds. During the year bureau experts inspected mine scales in Ohio, West Virginia, Kentucky, and Maryland, where bad conditions were investigated and rectified. The necessity of regular testing was clearly proven, the State mining laws were clarified on the points involved, effective safeguards assured, and the suspicions and discontent of the miners allayed. In all 352 railroad track scales were tested by the bureau in 33 States of the Union on behalf of the U. S. Railroad Administration, including 10 master scales used as standards to check locally the weights of the railroad's track-scale test cars. The results of the bureau's work are being incorporated in standard specifications for railroad track scales, prepared in cooperation with the technical interests concerned. These will promote efficiency and accuracy in large scale weighings on railroads, the importance of which may be gauged by the freight revenues collected on the readings of railroad track scales amounting to several billion dollars in a year.

The Twelfth Annual Conference on Weights and Measures at the Bureau of Standards, attended by 180 experts and delegates representing 29 States, adopted specifications for gasoline-measuring pumps, recommended that the bureau be empowered to pass upon types of measuring devices, approved the decimal flour bill, favored the sale of dry commodities by weight, the marking of net weight on wrapped meats, standardization of packages, and advocated the adoption of the international metric system of weights and measures.

The bureau has formulated model State laws, held conferences on the technical details of inspection service, and consulted State and local officials on technical legislation. Much of the new legislation is developed with the cooperation of the bureau. Several States, notably Texas, North Dakota, and South Dakota, have just enacted laws establishing State-wide inspection services for

the first time. Many States ask aid in establishing State departments of weights and measures, in field investigation, and in deciding the fitness of measuring devices. Specific aid was given Maine and Texas where new laws provide that after July 1, 1920, no weighing or measuring apparatus may be sold unless it is approved by the Bureau of Standards. These actions emphasize the need of a similar national law.

The bureau's length laboratory is the agency for the basic control of all length measurements and all measures derived therefrom. The distribution of accuracy in length is mainly through the standardization of the manufacturers' standards, which control output, and through the standardization of the State standard by which local inspection is regulated.

The bureau also devised means to measure the thickness of paint films—a problem of protection of ordnance shells, the paint film on which must be thick enough to protect and thin enough to avoid rubbing when fired. Methods were also developed to measure, with a high degree of accuracy, the celluloid photorecords of gunfiring. The wide range of technical uses of sieves in industrial laboratories and the great importance of fineness determinations led the bureau to a scientific study of the whole subject which has resulted in a revised scale of sieve sizes.

No length measures are more interesting than the modern precision gauge blocks by which the dimensional accuracy of tools, machines, and countless other factory products is assured. The bureau's successful development and production of gauges, which excel by 100 per cent the quality and accuracy of the best imported gauges, is now well known. The high precision of these gauges is controlled by the direct use of waves of light to measure the errors, some of them less than one-millionth of an inch. The Government was unable to obtain the needed gauges of this type from foreign makers during the war. It is interesting and significant that the bureau was able to develop the methods and make up enough gauges to supply the Government need at a total cost less than the market value of the imported gauges needed at the outset.

The bureau conducted courses of instruction in measurement and in the use of the bureau's special gauge-testing apparatus and methods in field work. The courses were attended by Government supervisors and inspectors from both War and Navy Departments and from manufacturers of munitions and military material.

Valuable work of the highest precision attainable is being done on the measurement of the expansion of materials with temperature. Two examples of the 121 tests made will illustrate. The bureau developed a new type of porcelain for use in spark plugs of motors. To prevent cracking at the high heats encountered, the expansion of spark-plug porcelain in service should be exactly the same as that of the metal electrodes used in producing the spark. So, too, dental filling amalgams must be "balanced"; that is, made up to expand equally with the teeth. The measurement of the minute changes of size involved required optical methods, the expansion being measured by the use of light waves. As a result of this work, specifications will be drawn up for these materials by the bureau in cooperation with the research institute of the National Dental Association.

The need for the bureau's work in standardizing capacity measures for technical uses is shown by the fact that only two-thirds of the volumetric apparatus tested by the bureau during the year passed the test. These measures included burettes, cylindrical graduates, dilution pipettes, transfer and measuring pipettes, and flasks. One-sixth of the density-measuring devices, hydrometers, salinometers, etc., were rejected. In addition to the testing of gas-meter provers, the bureau made an inspection of 103 large natural-gas meters used in supplying towns with natural gas, and disclosed the fact that several million dollars' worth of gas is being lost in a year by leakage in the distributing systems.

The Government shipbuilding program involves, among other things, a continuance of the testing of special timepieces for the new ships. In the time laboratory nearly 10,000 timepieces were tested, ranging from 12 minutes for stop watches to 100 days for master-clock systems. Class A certificates were given for 19 out of 82 watches tested. The system for testing is thoroughly established and the fundamental time indications of the Riefler standard clock of the bureau is maintained with a constancy within a small fraction of a second a month.

Electricity.

Electrical science and industry depend upon the bureau's fundamental standards for uniformity in the electrical measures and data which are the basis of all electrical work. These standards are applied to the industries largely through the makers of electrical measuring instruments and appliances. The manu-

facturers' standards are checked up at the bureau, thus assuring nation-wide uniformity at the source.

The bureau's electrical testing for the industries keeps it in close touch with industrial needs, and its testing for the Government assures suitable quality of delivered supplies and yields data needed by the bureau for perfecting standards of quality and performance. Such standards gather up new scientific results and service experience and apply them in the industries through the specifications for supplies and equipment, and thus become an agency for stimulating industrial progress.

The electrical laboratories cover work in photometry, radio communication, X ray and radium, and public utilities.

The bureau's researches in the war involving electrical principles covered many subjects—the location of enemy batteries by means of sound-recording mechanisms, the electrical control of airplane guns to fire between the propeller blades, time studies of gunfiring, variation of gun pressures, ejection-velocity studies by recoil meters, the development of kinemometers to measure the jumps and whip of a gun on firing, the measurement of projectile velocities inside the gun, and scientific studies of the gun blast. A special investigation of battleship-turret firing was made and the firing circuits greatly improved. From experimental work and the theoretical studies involved the bureau was enabled to develop numerous new devices and methods of measurement applied to artillery problems. The bureau's technical resources and ingenuity were applied to perfecting the plans of experiment and the devices themselves. The results in actual practice have been gratifying. A bureau expert was sent to France and England to further study the problems of gunfiring, and the basis for new and important work has been thus established. Other electrical military work included the investigation of technical methods of protecting ships against mines, the measurement of speed of bullets fired by centrifugal guns, and a large amount of technical consultation work on electricity applied to warfare. A recent report of the War Department announced that the latest sound-ranging system developed at the Bureau of Standards for the location of enemy batteries proved to be superior to all such systems in use when the armistice was signed.

An electrical method was also developed for measuring the velocity of flame propagation in the cylinders of internal-combustion engines. This is a contribution to the general problem of automotive power plants, the full program for which is being

vigorously taken up by the power-plant laboratory of the bureau. The electrical principles involved in the design of spark plugs, magnetos, and complete ignition systems are carefully studied. It is of interest to note that in connection with the investigation of the design of this new spark plug, the bureau's ceramics staff developed a new type of porcelain, having the electrical and thermal properties required.

The war made necessary the standardization of military supplies. The bureau's cooperation was sought, and some of its experts gave their full time for several months with a highly gratifying result. In fact, the success opened up the subject of standardization on a much broader scale, and, especially in connection with the electrical supplies and equipment, a most thorough standardization was completed. The results are embodied in the new catalogues of military supplies.

A valuable standardization work was the development of standards of quality and performance for electric dry cells. The vast number of these cells used throughout the country and by the Army and Navy made the subject one of considerable economic importance. The investigation was successfully completed and the results embodied in a published circular giving the specifications for and methods of testing dry cells. A similar work on storage batteries is well under way.

The bureau developed a method by which aviators may land in the fog or dark. The system involves the use of automatic radio signaling equipment on the landing field in combination with suitably designed direction finders on the airplane. Practical trials proved entirely successful. The development was undertaken for the Air Mail Service. A landing field was equipped for the purpose. Automatic signals are encountered by the airplane as high as 6,000 feet from the ground, and with the direction finder the aviator locates his position with respect to the ground and descends safely in fog or darkness. The bureau also developed and successfully applied the most successful submarine radio system, making possible signaling from a submerged submarine for a distance of 12 miles and the receiving of signals transmitted thousands of miles exactly as when received in the air. This work involved the development of a satisfactory direction finder for use under water.

The bureau has rendered special service to radio communication in connection with the so-called "electron tube," sometimes called by the more general name "vacuum tube." The new

electron tubes have revolutionized methods of radio communication since the outbreak of the war. The development has been so rapid that it became necessary to completely standardize electron tubes, so that their performance could be predicted in every essential respect. This theory was worked out, and the methods developed are described in a bureau publication now in press. Radio-research headquarters for the Army and Navy radio service are located in the laboratories of the Bureau of Standards, and there has been most cordial and complete cooperation between the Bureau of Standards, the Navy, and the War Department experts.

Public Utilities.

The standards for public utilities developed by the bureau relate especially to electric light and power, gas, street-railway, telephone service, and miscellaneous industrial utilities. The bureau conducts scientific and engineering research, studies the public-relations question, prepares specifications for the quality of such service, outlines methods of testing and inspection, formulates safety rules to safeguard the employees and the public, and collates and distributes information impartially to all concerned. Public-utility standards are based upon standards of measure, quality, and performance, and embody in numerical terms the ranges of the pertinent factors defining quality, safety, economy, convenience, and efficiency. Owing to the unusual conditions, the public-utility staff of the bureau during the past two years has been called upon for an unprecedented amount of work. The bureau attained an enviable position as an impartial referee in such subjects and settled disputed questions on a scientific basis. The work has been especially fruitful in assuring to the public a means of specifying adequacy and safety in the production and distribution of electric power, gas, and other forms of service.

The bureau's gas-service standards have proved of great usefulness. Cooperative investigations have been made on behalf of State and local public-service commissions in several States and for many cities. On behalf of the State commission for Indiana cooperative tests at coal-gas plants in the State resulted in new features of gas standards fully set forth in the bureau's report—the most complete and convincing effort ever made on behalf of a public-service commission to determine the best requirements for a State. The data will be valuable to the gas industry.

The bureau's investigation of an industrial-gas enterprise in Maryland resulted in technical recommendations to the management which will "ultimately turn a loss into a substantial profit." The bureau's staff visited 14 different localities, in addition to supplying many requests for information by correspondence and in conference. Much valuable data were made available for the gas companies and the municipalities on matters of controversy or public agitation.

The bureau's standards for electrical safety service are being revised on the basis of experience. In this work the bureau has had the cordial cooperation of public-service commissions, municipalities, and public-service corporations, as well as of national technical societies and individual experts interested in the production and use of electricity.

A new publication is now in preparation which will give the bureau's new "Standards for street lighting service." The experimental and field investigations of street lighting upon which these standards are based, comprised inspections of municipal and private plants, the direct measurements of street lights, and conferences with illuminating engineers and plant managers. Somewhat new in kind is the bureau's study of standards for central station, hot-water heating service undertaken for the State of Indiana. Technical rules covering the factors of adequacy and safety of such service formulated by the bureau were adopted substantially as recommended. These standards are included in a circular on "Standards for steam and hot-water service" now nearly completed.

Telephone service standards are of nation-wide importance, and the bureau is preparing two publications on the subject. The bureau gathers technical data for impartial dissemination to the telephone industry, to regulatory commissions, and to the telephone-using public. One new circular will give an account of the modern telephone service, and a second will describe in detail the service in selected cities. The bureau assisted in standardizing and defining the technical terms employed in telephony in America and Great Britain.

Standards of safety have engaged the earnest attention of the bureau's staff with a view to reducing life and property hazards arising from the use of electricity and from general industrial processes.

The Electrical Safety Code, of which a new edition is now in preparation, has been adopted by at least 20 administrative

bodies throughout the country and recommended for use by many others. In several States, notably Pennsylvania, Wisconsin, and Montana, this code is now mandatory. It has been voluntarily adopted by a large number of industrial concerns and, in general, has met with nation-wide approval.

There was held at the Bureau of Standards a conference on industrial safety codes which was attended by more than 100 representatives of different interested organizations. The conference agreed that the Bureau of Standards should lead in the work, and plans are now under way to arrange the most effective cooperation in the preparation of industrial safety codes. The bureau has already prepared a number of such codes, namely, National Elevator Safety Code, National Code for Safeguarding Machines and Machine Drives, National Code for the Protection of Head and Eyes of Industrial Workers, and National Code for Safeguarding Remote Control Apparatus.

The bureau's technical investigation of the damage to structures by stray electric currents from street mains has resulted in the development of standard electrolysis surveys and standard procedure for electrolysis mitigation. Solutions were recently arrived at in several cities in Missouri, Ohio, and Indiana. New apparatus for use in electrolysis surveys has been designed, constructed, and tested at the bureau. The results are so satisfactory that they will be applied to the bureau's field work during the next few months.

Radium.

The importance of radium in surgery and in dermatology has caused a rapid growth in the bureau's testing-of-radium preparations, 474 of which were tested during the year, containing a total of 13,159 milligrams, having a market value of \$1,500,000. These specimens were certified about equally for the military departments, for commercial export, and for domestic use.

An important use of radium salts is in the self-luminous paints for marking watch dials and other objects.

The modern use of such materials containing radium salts has rapidly developed. The demand for their standardization resulted in the bureau's taking up the work at the request of the Army and Navy. The bureau furnished information concerning the properties of luminous materials, methods of measuring their brightness, estimates of cost of preparation of apparatus and supplies for factory inspection of the dials, extended study of selected speci-

mens by experiment, and the preparation of models. In this work the bureau has had the most cordial cooperation of the manufacturers and civilian users. Much information is included in a circular on "Self-luminous materials," prepared by the bureau for early publication.

Heat.

The measured control of temperature is a vital factor in many industries. The Bureau of Standards maintains the standard temperature scale for the country, conducts researches in heat and temperature measurements, the measuring apparatus used, and distributes samples of standard pure metals having certified melting points, and of standard materials having certified combustion heat values. These certified materials are used locally to standardize the heat and temperature measuring apparatus in industrial laboratories for the control of processes of production. During the past year 20,000 thermometers and other heat-measuring devices were tested and certified in the bureau's laboratories. The heat division also serves as a national bureau of information on temperature and heat measurements; hundreds of letters and scores of visiting experts have called for a wide range of data needed in the conduct of industrial researches or in the control of industrial processes.

The maintenance of the fundamental temperature scale requires elaborate researches and exacting experimental work. The scales are fixed by the melting and boiling points of metals and other materials, the basic 100° interval lying between the freezing and boiling points of water. A type of research required is illustrated in a paper, published during the year, on the standardization of the sulphur boiling point, one of the fixed points of the temperature scale. To secure constancy of indication of this boiling point, specific experimental conditions must be carefully observed. Similar precautions must be adopted in all other fixed-point determinations. A new thermometer comparator was devised in which melted metal secures the needed temperature uniformity.

Success in producing high-quality optical glass depends upon the removal of internal strains by effective annealing methods. The heat experts of the bureau recently developed methods for such annealing and for determining by simple tests the practical temperatures required and procedure to be followed. The time-temperature curves for producing ovens were worked out by bureau heat experts for two leading types of coke ovens. The

determination of the properties of ammonia now completed supplies refrigeration engineers for the first time with complete and reliable data on this important material, for the calculation of tables covering ranges from -75° to $+70^{\circ}$ in place of the meager data previously available.

During the year 106 structural columns were tested in the systematic program of investigations on the fire-resistive properties of structural materials to furnish needed basic data as to materials commonly used in buildings under fire conditions. Fire tests were followed by water application to determine the final resistance of the columns to fire and their action when suddenly cooled by hose streams. The resulting data are the most comprehensive ever available. Unprotected steel was found to sustain loads for less than a half hour, concrete columns for over eight hours. Duplicate tests checked within 10 or 20 per cent. The bureau also cooperated in fire-safety work and in the movement for fire protection and prevention. Special conferences were held on the hazards in cotton ginning, fertilizer handling, petroleum shipping, pyroxylin plastics, including motion-picture films.

The Bureau of Standards has the only "altitude laboratory" in the country. This is a small room which may be made airtight and the air partially removed to produce the low pressures encountered at high altitudes. The laboratory and results obtained have been described in four published reports. The engine to be tested is operated in the room and is supplied with cold air at temperatures actually encountered at any altitude desired. Aviation engines of several types, including the "Liberty 12," have thus been tested at simulated altitudes of 30,000 feet under the most scientific observation and measurement.

The new "altitude laboratory," now nearly completed, will furnish ampler space and exceptional facilities for testing internal-combustion engines for automotive purposes. Scientific studies on basic problems are in progress; for example, on the rate of flame propagation in a gas-engine cylinder and on pressure cycles, carburetion, ignition, lubrication, etc. The work is a splendid example of technology developed during the war and adapted almost without change to important industrial uses.

A series of informal bulletins were issued to disseminate the results of the bureau's engine researches. Seven such bulletins treated of spark-plug problems, seven of engine radiators, and other reports will appear in the next volume of the proceedings of the National Advisory Committee for Aeronautics. The demand

for the bureau's tables of melting points of the chemical elements exhausted the edition, and a more complete edition, recently prepared, completes the present data on fixed temperatures. The bureau has published a number of scientific papers on high temperature subjects; e. g., optical methods of temperature measurements above $1,500^{\circ}$ centigrade; recording pyrometry for use where a printed record is useful; automatic control of high temperatures by which, for example, the supply of fuel is automatically varied to maintain the furnace at any desired temperature. Serious losses entailed by furnace failures make a recent paper on the melting points of refractory materials a timely contribution to industrial economy.

History of the Production of Optical Glass by the Bureau of Standards.

The removal, now in progress, of the optical-glass plant from Pittsburgh to Washington closes the first period of its history. A brief résumé of its work follows:

For some time prior to 1914, the bureau had felt the necessity of the United States shaking off the yoke of complete dependence on Europe for its optical glass. European manufacturers had so carefully guarded the secrets of their technique that the necessary preliminary investigations were far too extensive and too expensive to expect commercial corporations to undertake the pioneer work. With this object in view, a scientific expert, with a knowledge of glass making, was appointed in July, 1914, to take up experimental investigation of the production of optical glass. He was not an expert in optical glass, however, for there were none in this country at that time. The necessary preliminaries had been completed by December, 1914, is shown by a report of three "runs of optical glass" for that month.

In 1915, 76 melts and 54 pots were made, a new furnace built, 3 different types of optical glass produced, and some annealing experiments carried out.

The new developments of 1916 included the building of a three-chamber furnace, comparative corrosion tests of the molten glass on pots made of domestic and imported clays, the production of a "very satisfactory" new mixture for pots, and, finally, a batch of borosilicate glass, free from striæ, although not entirely free from bubbles.

The investigations of 1917 brought out the fact that the poor melts were largely due to unsatisfactory pots. So, the solution

of this problem was attacked with increased vigor, resulting in one of the most important steps forward in the history of glass production anywhere; i. e., the casting of pots instead of making them by hand. This method greatly reduces the difficulty, the time, and the cost of making the pots. Those obtained on the market were strongly attacked, especially by the barium glasses, sometimes being eaten entirely through by the molten glass, with the result, of course, that the glass mixture was both impure and discolored.

When this country entered the war in April, 1917, the bureau had made over *one hundred* melts of glass and nearly that many pots.

Furthermore, it was *at that time* making melts of the important borosilicate and barium crown glasses on a commercial scale. In November, 1917, 16 melts of 600 pounds each were reported and shipments to the factories made. From then on regular shipments continued, that one in the month preceding the armistice being recorded as 3,021 pounds of first-grade binocular glass, representing more than 15,000 pounds of glass actually produced.

True to the original object in view, the bureau, in addition to the production of considerable optical glass for military purposes, has at all times given freely all possible assistance to those engaged in the manufacture of glass. They have frequently consulted its experts as to methods of manipulation, materials, and the manufacture of pots. Conferences have been held at the bureau and its experts sent to the factories when requested. These efforts have been cordially received and appreciated, as shown at one of the meetings of the optical-glass section of the War Industries Board, where the president of a large glass corporation stipulated that they would take up the production of optical glass for one of the entente nations provided the Bureau of Standards would send experts to the factory to lend technical help.

Light.

The bureau develops light standards, instruments, and methods for measuring light illumination, and determines the optical properties of materials and optical instruments. The precise measurement of light waves, apparently of purely scientific interest, proved to be of the utmost practical value during the war, since light waves were used by the bureau to control the accuracy of the master gauges used in the manufacture of munitions.

The bureau continued the precise measuring of standard wave lengths of selected radiation of the various chemical elements. Special experience and facilities in red and infra-red photography enabled it to do useful work in this field of radiation in the study of solar radiations which could not be photographed heretofore nor observed visually. The bureau's recent spectrographs of the sun in the red and the invisible radiation beyond the red proved the presence in the sun of 27 known elements. In the red-region radiation, or spectra, 8 metals and 2 rare gases were examined, new work nearly completed on 10 other elemental metals, and work on rare earth elements begun.

The bureau has had success in photographing through light fogs or haze. Color screens to cut off the characteristic light of the haze in combination with red, sensitized photoplates enable the plate to record only the light from the landscape behind the haze. The pinacyanol-stained plates proved four times faster than the best commercial panchromatic plates in use. New and important fields of optical research are thus opened in photography which will demand the design of new lenses adapted to red light, the study of radiation reflection by landscapes, and special studies of sensitizing dyes.

Color standards and methods of color measurements are now being placed on an excellent scientific basis. The bureau proposes, in certain cases, to discontinue color grading in terms of material color standards which are difficult to obtain, duplicate, or certify accurately. The new method is to determine the color transmission of light of a definite wave length. This gives an essential property of the material itself independent of the color vision of the observer. The observation easily made in reproducible units eliminates arbitrary, ill-defined standards. Systematic color standards and measurements are of interest in many industries—paints, dyes, inks, textiles, paper, flour, soap, tobacco, butter, and other products—all make the field one of much commercial and economic value. The special work of the year included the color grading of papers, pyralin ivory, cottonseed oil, and other materials. The terms used in colorimetry need standardization, and the bureau has aided in systematizing not only the nomenclature, but the units, standards, and symbols.

At the request of the eye-hygiene committee of the American Medical Association, the bureau is investigating various glasses now on the market purporting to suppress harmful radiations.

A technologic paper was prepared on the basis of tests of 82 samples of eye-protective glasses now on the American market. With this data, oculists or buyers may now prescribe or order glasses having any desired color transmission, acceptance being based upon color tests.

Research on quartz resulted in a new means of fixing one point on the high-temperature scale in a region not otherwise well defined; i. e., $573^{\circ}.3$. A very sudden change occurs in the optical properties of quartz, the sharpness of which makes it suitable for the purpose. The action of quartz in twisting the direction of vibration of light waves is known as polarization. This is the basis of polarimetry. The subject has a high theoretical value in physics and many practical uses; e. g., it is the practical basis of sugar testing. Sugar technology is based upon the readings of the polarimeter, which indicate the percentage of pure sugar in a raw sample. The bureau standardizes the quartz plates, instruments, and accessories used, and a new fund granted by Congress has recently given special impetus to the work, which is proceeding vigorously in cooperation with sugar technologists and the sugar industry.

The distribution of the bureau's standard samples of highly purified sugar for verifying polarimeters is an important means of technical control in the industry. The optical analysis of sugars at the bureau has been a useful service to the industry and in the control of the precision of sugar analyses of imported sugar for the Customs Service.

The Medical Service of the War Department requested the bureau's aid in producing certain rare sugars, about 25 in number. The bureau has tested a number of these by methods devised by careful research. The insistent demands for these rare sugars has led the bureau to study the sources and production. These sugars range in value from a few dollars to several hundred dollars a pound. The bureau has already developed successful methods for producing pure, white crystals of the so-called d'mannite sugar by double crystallization from the crude manna and at a reasonable cost.

An example of the use of abstract physics for practical purposes is the use of interference of light waves in studying the behavior of the porcelains and amalgams used to fill teeth. The bureau has for some time been investigating the expansion of such materials when exposed to changes of temperature. This calls for exact measurements of the expansion of these materials when heated.

Light waves and the phenomenon of interference are used to measure this expansion with great precision. These dental materials were found to expand four times as much as the natural teeth themselves. The data will aid in the development of more perfect filling materials for the teeth.

The bureau designed and constructed or cooperated in the development of many military optical devices. It designed a spotting camera, for example, and redesigned a triangulation camera for the Navy. The spotting camera complete with a manual of instructions was turned over to the military authorities, and the triangulation camera is now completed. The bureau designed another camera for the panoramic photographing of the inside of a machine-gun barrel. Related work included a night-firing device, a marine position finder, a tank sight, a 37-millimeter gun sight, a periscope alidade, Army binoculars, and many other instruments. The bureau also tested 2,000 binoculars, 54 lens systems, 436 samples of optical glass, and made 111 tests of miscellaneous optical devices.

Radiometry comprises the field of visible and invisible radiation. The work is mainly experimental and theoretical, but its immediate application to the industries is both direct, interesting, and important; for example, in high-temperature measurements and researches on efficiencies of light sources. The bureau's expert reported to a Government department that plain glass is as useful in greenhouses as the ribbed and hammered glasses sometimes considered for such purposes. A radiophonic system of secret signaling was developed by the use of the radiation properties of molybdenite. The sensitiveness of this material made it possible to secure a loud, musical sound by the invisible radiation of wave lengths longer than red light. A system of invisible light signals was also developed, using the ultra-violet waves. Recent use of applied radiometry was made in connection with the glass roofs of balloon hangars. On request of the War Department, the bureau recommended a substitute for the special colored glasses designed to exclude the ultra-violet rays which have serious effect on balloon fabric. The bureau's advice was that they use asphaltum varnish on plain glass, which, of course, is much more economical.

Chemistry.

In addition to distinctly chemical standardization, chemistry is required in all fields of physical standardization. Many articles published on chemical subjects on work done at the bureau show

the variety of application of chemistry in physics and the special technologies. During the year, 18,436 chemical tests were made by the bureau, largely of materials purchased by the Government. Many researches were under way during the year, among which several examples may be cited. Pure materials and their uses form a series of standardization problems. The purification of mercury is now on a routine basis. Pure methane was produced for determining accurately its heat properties. Pure ethyl alcohol was prepared for use in measuring its density and other properties.

The bureau's electrochemical work included several useful researches, such as the lead plating of gas shells, black nickel plating for military equipment, and zinc plating to protect steel from corrosion. Gas chemistry has had at the bureau certain useful applications in aircraft. Balloon fabrics were tested for gas permeability and lasting qualities, and methods and instruments were developed for conducting such tests.

A new automatic gas-analysis apparatus, constructed at the bureau, is now in operation at the Government nitrate plant at Arlington. Apparatus was also constructed to record the amount of helium in preparing the gas for use in balloons, and a set is now under construction for the large helium plant of the War Department by which 12 simultaneous and continuous analyses of helium output are automatically made. The shortage of platinum during the war led the bureau to the study of platinum substitutes and certain alloys of gold containing palladium were found suitable for many chemical operations.

The bureau has continued its interest in standardizing reagents and in the proper labeling of chemical reagents, so that the serious difficulty attending their use by chemists may be reduced. The bureau has organized an interdepartmental committee on paint-specification standardization, and a conference was held at the bureau. The first results are embodied in the Standard Specifications for Linseed Oil, recently published by the bureau. A new edition of the circular on soaps was issued.

In addition, the bureau has continued technical analyses and chemical researches on a very wide range of materials.

Materials.

The bureau's work in materials includes a wide range of structural and miscellaneous materials, such as metals, cement, lime, paper, textiles, rubber, leather, oils, clay products, etc.

All cement used by the Government, by Executive order, must conform to the United States Government standard specifications for cement. The cement tested by the bureau covered shipments of 6,588,923 barrels, practically double that of the previous year, and 12 times the amount tested in the year 1916-17. The rejection of 10 per cent of the cement tested shows the need for such testing. Researches were made on the properties of cement and concrete, fineness of grinding, air analysis, standard cement sieves, volume changes in finished mortars and cements, concrete oil storage, waterproofing of concrete and stucco, and the acceleration of hardening of cement. The bureau's samples of finely ground cement of definite and certified fineness of grain enables the technical laboratories of the country to standardize their own sieves accurately.

The construction of concrete ships was initiated in the bureau's cement laboratory, the chief of which became the directing head of such construction. The bureau has since continued its technical cooperation with the Shipping Board in numerous ways. During the year, a study of the cement gun, by which the material is shot in place instead of being cast, was completed and reported upon. Improved methods were developed affecting the properties and ingredients of cement and concrete and the time of mixing. A useful improvement consisted in the use of paper molds in place of the steel molds hitherto used for casting concrete test cylinders.

Lime has commercial uses not only as a structural material, but in other industries. Standards of quality for lime are quite recent. In the work on lime the bureau has had the cordial cooperation of the National Lime Association and similar organizations, all of which have committees on cooperation with the bureau. Important researches under way during the year have included the compressive strength of cement and lime mortar, the effect of hydrated lime on the properties of cement, causes of "unsoundness" in lime plasters, and the measurement of plasticity. The bureau's methods developed for the study of plasters apply also to gypsum and other wall plasters.

Rubber has such varied and important uses that the bureau endeavors to handle basic problems of the physics and chemistry of rubber and develop methods of test. Methods of determining the ingredients have been developed, and many samples of manufactured rubber goods were analyzed during the year, including

balloon fabrics, rubber tires, rubber packing, hospital supplies, fire hose, and others. The bureau tested within a year samples representing the purchase of about 250,000 tires and established a local laboratory at one of the large rubber centers. Assistance was rendered to makers of solid-rubber tires in improving compounds used, and as a result a solid tire was developed which met all requirements. The possibilities of rubber research are as broad as the usefulness of the material. In the new quarters in the industrial laboratory it is expected that the work may be extended to include important and fundamental investigations.

The technology of leather is an important part of the bureau's work. A research completed during the year had to do with certain chemicals, including glucose and salts, which are put into the leather. The bureau is working in close cooperation with the 'Tanners' Council, the American Leather Research Laboratory, and the War Department. Special studies were made on sole leathers and on leather for shoe uppers to be used in the making of Army shoes, and also on the physical properties of harness leathers in connection with the stuffing material. Miscellaneous tests in the leather laboratory cover leather packings, water-proofed leather, and artificial leather.

The bureau cooperated in an advisory capacity in the development of specifications for leather for the General Supply Committee, the War Department, and the Panama Canal. Much progress may be expected during the coming fiscal year in this direction. In this connection, arrangements have been partially completed for installing an experimental tannery at the Bureau of Standards for use in leather research. The new laboratory provides ample space for extensive research and testing in accordance with an outlined program.

The Government uses approximately 50,000 tons of paper per year; this is bought on specification and tested at the Bureau of Standards. Five thousand samples were examined, of which 4,213 were for the Government, which included more than 19,000 separate tests. The bureau demonstrated that 700,000 bales of munitions linters left unused when the war closed could be used for the making of paper. Samples of paper were experimentally made on its paper mill to demonstrate that good paper could be made from such linters. As a demonstration, the programs of the annual convention of the Interstate Cotton Seed Crushers' Association of New Orleans were printed on paper manufactured at the bureau from cotton linters. About 700,000 bales per year are available for

paper making, and, if care is taken to keep the linters clean, a still larger amount can be utilized.

The physical, chemical, and microscopic testing of textiles is an important field of the work of the bureau which has had special value during the war in connection with Army uniforms, blankets, airplane and balloon fabrics, tent material, and other fabrics. The examination of English, French, and German fabrics showed that few of them were as good as the average of American manufacture. Woolen uniforms were examined for fastness of color, nature of dye, and the amount of cotton present. During the year an investigation has been in progress on sizing compounds for cotton yarns preliminary to the work on practical experiments in the bureau's cotton mill. In connection with airplane fabrics a study was made of stress in flight and new fabrics were designed and manufactured to improve serviceability. The increasing size of airplanes makes it important to have a stronger fabric. With the same object a tautness meter was designed and constructed at the bureau for the study of the wing fabrics in flight. Numerous readings taken on wing coverings of planes showed that tautness may be used to interpret the effects of humidity and temperature on the life of the fabric. With the occupancy of the new industrial laboratory, the textile section will have unusual equipment for research—a small felting unit, a complete unit of cotton machinery, and a similar outfit of woolen machines. These are of the latest manufactured design improved for the accurate requirements of laboratory work. One important object in view is the development of exact specifications for fabric, especially for the military departments. Such specifications will also be useful for other purposes, and the general results of the investigations will all be of service to the textile industry and the general public.

The testing-machine laboratory has continued a long list of useful investigations during the year, the tests numbering 3,000 in all. Some of these were extensive researches such as the test of a 150-ton floating crane for the Norfolk Navy Yard, the experimental study of electric welding for the Emergency Fleet Corporation, and technical investigations of motor-truck wheels and their behavior under stress.

Aeronautical Instruments.

Measuring instruments are vital to control in aviation, and the standardization of such instruments is of the utmost urgency.

The bureau reached mathematical solutions of the theory of such instruments, so that the results may be applied to particular cases. The failure of the metals used in the construction of aeronautic instruments to be perfectly elastic proved to be a critical source of error, and alloys were developed which are believed to be superior to the metals previously used. The bureau has tested 578 airplane instruments, completed researches on the errors of instruments, studied different types of tachometers, and determined the complete corrections for the barographs used in the flight which established the world's altitude record.

Members of the bureau's staff conducted flight tests of airplane instruments, making airplane flights in the dark to demonstrate a projection-type, night-altitude indicator. A series of high-altitude flights was made to study the oxygen-supply apparatus, the rate-of-climb indicators, the gyroscope, and other inclinometers. Tests were also made in flights across the English Channel and in the suburbs of Paris.

An interesting example of the bureau's work in technical education was the school of aeronautic instruments conducted for aviators. This included a three-weeks' lecture and laboratory course covering the theory and testing of aeronautical instruments. The data and other illustrative materials for similar courses were also furnished for the use of the Army.

Metals.

The metallurgical division of the bureau engages in fundamental researches affecting the improvement of metals, the development of new metals, and methods of avoiding metal failures and prolonging the useful life of metals and metal products. For this purpose, the bureau has a well-equipped experimental foundry, rolling mill, metallographic laboratory, heat-treatment laboratory, chemical laboratories, and a full equipment of electrical furnaces and pyrometers. The standardization of the purity, the composition, microstructure, and heat treatment are possible only through the measured control of all the factors, such as temperature, rates of heating and cooling, pouring temperatures, etc. Many practical problems of metal failures have been solved in the laboratory and a great amount of work done on improving the quality of metals by heat treatment and the standardization of pouring temperatures and finishing temperatures.

An important output of the metal laboratory consists of specifications for metals for special uses. During the war a series of

aircraft-materials standards were developed. In peace times the specifications cover the regular supplies needed by the Government departments, and special cases, such as statuary bronzes and metals for other special uses. Several cases of the bureau's aid to the metal industries will illustrate the work. Collapsible tin tubes are used for many classes of materials, and at the request of manufacturers of such tubes the bureau pointed out the several causes of defects. The behavior of aeronautic-pressure instruments depends upon the metal diaphragm. The success of several new alloys designed to correct the errors in such instruments depended upon proper annealing, for which suitable methods were developed by the metal experts. The bureau studied the deterioration of zinc-aluminum alloys used in die casting and reported upon the limitations of such material for this work. In another case the causes of certain defects in sterling-silver ware were pointed out after careful study of the ware. Manufacturers of razors and cutlery have recently requested the bureau to devise methods for measuring and defining the sharpness of fine cutting edges. Since this is practically a new field of standardization, there is little or no available or published experience to serve as a basis.

Changes in the rate of cooling observed in any metal are indications of quality and composition. The study of these is called "thermal analysis." An inexpensive method for such work was applied at the bureau during the year, a stop watch being substituted for the expensive chronograph usually used. Heat treatment is being examined with great care, and work is in active progress on a widely used structural alloy steel (containing $3\frac{1}{2}$ per cent nickel). The purpose is to correlate the properties with certain tests now made throughout the country. A detailed study of high-speed steels is being made to gain knowledge of their constitution and properties and to develop a method for comparing the relative value of two cutting steels. An important investigation is under way to find suitable steels and treatments for the same for use in making precision length gauges. The important factors in this work are the determination of the resistance to wear and deformation with time, the resistance to corrosion, soundness, expansibility, and economy under varying heat treatments.

Small amounts of gases like nitrogen, hydrogen, and carbon dioxide affect the breaking strength and other properties of metals. These questions must be attacked in a fundamental way, and the work in pure metals has this study as one of its

objects. Such pure metals are melted in vacuum furnaces, and the product is practically gas free. In the making of alloys uniformity is an important result to be attained, as segregation naturally is detrimental to the quality of the alloy. The bureau has conducted many studies of the "segregation" of the ingredients in the alloys. Work now in progress includes the preparation of electrolytic iron and melts or alloys prepared in vacuum, the making of pure aluminum, methods of determining gases in steel, deoxidizing agents for steel making, and the development of methods of steel analysis.

The bureau foundry is for experimental casting of metals and alloys and also is used practically as a commercial foundry supplying special castings for instrument parts required at the bureau and by other Government laboratories. This is one of the very few experimental foundries in the country, and it has many possibilities for service to industry. The work of the foundry included studies of Government bronze and its substitutes, studies of the relation of statuary bronzes to their weathering effects, efficiency studies of electric furnaces, investigation of light aluminum-casting alloys, and practical and experimental castings for laboratory use. An auxiliary investigation of molding sands of various types is of great importance to the foundry industry.

New Industrial Laboratory.

The branch laboratory of the bureau which has been maintained for some years at Pittsburgh, Pa., is to be discontinued and the equipment, staff, and work consolidated with the main laboratories of the bureau in Washington. On the completion of the new industrial laboratory designed to house this work, the installation began, and at this writing much of the equipment is transferred from Pittsburgh into the new quarters. In this connection, attention should be called to the excellent design of the new building and the unusual facilities which will be afforded for industrial research, facilities probably unexcelled in any laboratory. The facilities of the new laboratory include the full resources of the well developed and equipped laboratories of the scientific divisions, chemistry, heat, light, electricity, and the measures of length, mass, capacity, density, pressure, and time.

Ceramics.

Clay products form a whole group of useful and art industries, ranging from the crudest brick and tile to the finest porcelains used in the household, including the art porcelain ware, vases,

and other art products. The bureau's laboratories have been able to reproduce many of the finest qualities of foreign ware, both body and glaze. Chemical porcelain ware is a type of successful work accomplished. Much remains to be done in placing the clay-products' industries on a thoroughly scientific basis, but great progress has been made.

The refractory materials used in numerous industries have been the subject of investigation at the bureau and new substances having superior qualities have been developed. Several companies have undertaken to manufacture, for example, a new type of refractory proposed by the bureau last year, which combines light weight, porosity, good heat-insulating properties, and a high refractoriness, and is especially suited for use in marine boilers as furnace crowns, and for kiln blocks for terra cotta. The bureau has been able to produce pyrometer tubes more than 7 feet in length of American porcelains, similar to those imported from Germany before the war.

The investigations of hard-fire porcelains which have been under way for three years are nearly completed. The properties of more than 300 compositions have been studied to acquire the technical data needed in the industry. Several thousand pieces of tableware were glazed and fired. The results will shed much light on practical aspects of hard-fire porcelain manufacture.

Tiles used in wall construction were the subject of an important investigation by the bureau. The results of about 250 tests are published in a bureau technologic paper. The data will be valuable for the building industries. It is found that the source of the clay profoundly affects the clay behavior. The correlation data will be complete when the results of similar tests from other laboratories are assembled. Gratifying results were obtained in the study of architectural terra cotta. Much attention was paid to examining materials in actual buildings for various periods of time. Two striking types of failure were studied and accounted for. The laboratory work included absorption tests, artificial freezing, and strength determinations of terra cotta made from various clays largely used by manufacturers. The test pieces were burned at seven different temperatures. The resulting data will soon be announced in a final report covering all the work of the bureau on this building material.

Two technologic papers have been issued on the principles of iron enameling and researches are under way to solve problems met with in the manufacture of such materials.

The new industrial laboratory will give unusual facilities for the work in clay products. All of the contracts for the new kilns and furnaces have been let, the machinery has been purchased, and the installation of the equipment has been begun.

The Bureau and Industrial Progress.

The Bureau of Standards occupies a pivotal position in industrial reconstruction following the war. The great lesson of the war was that standardization was a first essential to efficient warfare. War industry differs from the industries of peace mainly in its urgency. The fundamental technical knowledge and requirements are similar. The military work of the Bureau of Standards during the war, therefore, will be of value to the industries during the critical days to come. The applications of science to industry are now recognized as of priceless value by the leading countries of the world. For this reason England, Australia, and Japan, among others, have on a new and large scale decided upon national programs of scientific research on the vital problems of industry. There is some danger lest we miss the full lesson of the war while other nations make prompt application.

Technical experts, societies, and the industries begin to realize the supreme importance of standardization, and the era of standardization may be said to have fairly begun. The bureau is represented on practically all of the great standardizing committees of the technical societies and is working in close cooperation with them. For the Government the bureau is a scientific advisor on the subject of standard specifications and has performed this service for practically every department and governmental agency, notably the War Department and the General Supply Committee.

In many cases the Bureau of Standards conducts fundamental researches in the laboratory on points which the specifications disclose. It is only by such research that it is possible to formulate standards of quality and performance of materials and appliances. The universal interest in standards reflects the growing appreciation of standardization as a means of industrial progress. The annual review of existing specifications for the purpose of incorporating new knowledge has had a most fruitful effect in stimulating the prompt application of new scientific knowledge.

It is doubtful whether there is another subject as fruitful of improved economy and efficiency as the standardization which is

basic to all industry. It is the standard of quality which determines the materials to be used, the form which they take, and the processes by which they are produced in the factory. It is also the standard of performance which is the user's ultimate test. In other words, standardization involves nothing less than the complete technical control of industry, by which is meant that modern industry must be based upon scientifically ascertained standards whether of measure, of quality, of performance, or of practice. From a national point of view, the work of the Bureau of Standards, therefore, is directed toward making itself as effective as possible in stimulating and in actively cooperating by research and investigation in all standardizing movements in which its cooperation is sought. The annual report of the Bureau of Standards shows many interesting examples of the variety and usefulness of this work.

BUREAU OF THE CENSUS.

(SAM. L. ROGERS, *Director.*)

The end of the fiscal year 1919 marked the close of the seven-year intercensal period during which the Bureau of the Census carried on numerous lines of statistical work at decennial, quinquennial, biennial, annual, quarterly, monthly, and semimonthly intervals, as prescribed by law; and on July 1, 1919, began the three-year decennial census period, within which time censuses of the population, agriculture, manufactures, mines and quarries, oil and gas wells, and forestry and forest products of the United States will be taken, compiled, and published.

During the fiscal year 1919 the Bureau of the Census carried on the compilation of the results of its quinquennial census of electrical industries; completed the work on its decennial inquiries relating to transportation by water and shipbuilding; brought well toward completion the preparation of its decennial report on religious bodies; completed and published a special report on marriage and divorce; conducted the regular annual inquiries relating to births, deaths, States, and municipalities; published quarterly statistics of stocks of leaf tobacco; made monthly and semimonthly collections and publications of statistics on cotton, cotton seed, and cotton-seed products; made special enumerations of the population in four counties; carried on the publication of weekly mortality reports for certain large cities; compiled statistics relating to the mortality from the influenza epidemic; performed a large amount of war work for other governmental establishments;

complied with numerous requests for information; and made detailed preparations for taking the Fourteenth (1920) Decennial Census.

The work done along the above lines during the fiscal year and since its close is described below.

CURRENT AND COMPLETED WORK ON STATUTORY INQUIRIES.

Electrical Industries.

This quinquennial inquiry, covering central light and power stations, electric railways, telephones and telegraphs, and municipal electric fire-alarm and police-patrol signaling systems, was made as of December 31, 1917.

The greater part of the data were obtained through correspondence, but it was necessary to send a number of men into the field to obtain information. The field canvass was begun in April, 1918, and was substantially completed in the following December.

Preliminary reports pertaining to the several inquiries covered by the canvass were prepared and issued. The final reports on telegraphs and on electric fire-alarm and police-patrol signaling systems were issued in the form of a single bulletin on July 19, 1919; and the work on the reports for the other inquiries is nearly completed.

Transportation by Water.

This decennial inquiry was made as of December 31, 1916. In order to avoid the disclosure of information of value to the enemy, the report was not made public during the war. After the signing of the armistice the report was completed and sent to the printer, and will be ready for distribution in the near future.

Shipbuilding.

Statistics for this industry were collected in connection with the last quinquennial census of manufactures, covering the calendar year 1914, and a further canvass was made in conjunction with the census of transportation by water, taken as of December 31, 1916. Although the results of these two investigations were compiled and the preparation of the combined report completed prior to the beginning of the fiscal year 1919, the same were withheld from publication because of the inadvisability of giving out the information during the war. The figures, however, were placed immediately at the disposal of the Shipping Board and other war agencies of the Government. In January, 1919, the manuscript was sent to the printer, and the report was issued, in bulletin form, on May 16, 1919.

Religious Bodies.

This decennial inquiry covered the calendar year 1916. The work was done almost entirely through correspondence. The preparation of the report was frequently interrupted by war work. On May 2, 1918, the bureau issued preliminary figures, subject to correction, showing the basic facts, and on January 17, 1919, a revision of the first statement was published presenting additional statistics. The complete report is being issued in the form of two bound volumes having a total of 1,318 pages.

Vital Statistics.

Births.—The “birth-registration area,” which, when established in 1915, comprised 10 States and the District of Columbia, approximately 31 per cent of the total population of the United States, grew rapidly, until in 1917 it embraced 20 States and the District of Columbia, about 53 per cent of the country’s population. No changes have been made since 1917. During the year 1919 tests were made in Illinois and Mississippi, but the birth registration in both States failed to measure up to the bureau’s standard of 90 per cent of completeness.

A press summary of the birth-statistics report for 1917 was issued in June, 1919, and work is progressing on the report for 1918.

Deaths.—The “death-registration area” now comprises 30 States, the Territory of Hawaii, the District of Columbia, and 23 cities in nonregistration States, and contains approximately four-fifths of the population of the United States. The most recent additions are Illinois and Louisiana, admitted for the year 1918, and Mississippi, admitted for 1919.

A press summary giving statistics of deaths covering the calendar year 1917 was issued June 25, 1919. The annual mortality report for 1917 has been completed.

Weekly Health Index.—The publication of the Weekly Health Index, inaugurated in October, 1917, giving mortality reports for 46 of the largest cities of the country, has been continued. During the epidemic of influenza and pneumonia, additional sheets were included, which gave the number of deaths resulting from those causes. Beginning with the issue for June 17, 1919, there have also been presented in each week’s issue statistics, obtained from the leading industrial insurance companies, showing number of policies in force, total number of death claims, and number of claims per 1,000 policies in force.

Need of Federal legislation providing for registration of births and deaths.—In the matter of birth and death registration the United States has not kept pace with many of the other countries of the world. This condition is due to the fact that registration has been left to the control of the State governments, many of which have failed to establish and maintain adequate systems of recording births and deaths. The practice of the Census Bureau is to admit to the birth-registration area those States, and to the death-registration area those States and those cities in nonregistration States, in which the bureau's tests indicate the registration to represent at least 90 per cent of all births, or of all deaths, as the case may be, if the registration systems justify the expectation of a more nearly complete registration in the future.

Thus far the only legislative action taken by the Federal Government toward the improvement of our vital statistics is found in a joint resolution of Congress, approved February 11, 1903, requesting the State authorities to cooperate with the Census Bureau in securing a uniform system of birth and death registration. The bureau has achieved some success in arousing the interest of the States in the matter. Under present conditions, however, it is likely to be many years before the last one of the 48 States enacts and properly administers adequate registration laws. It will thus be necessary, if the birth and mortality records of the country are to be reliable, permanent, and readily available for reference, to provide for a comprehensive system of Federal control and supervision.

Financial Statistics of Cities.

The report presenting financial statistics of cities having over 30,000 inhabitants, for the fiscal year 1918, has been completed. This report presents detailed statistics of revenues, expenditures, value of municipal properties, municipal indebtedness, assessments, and taxation; and also gives certain data relating to governmental organizations. The field and office work on the 1919 inquiry is now in progress, and it is expected that copy for the report will be sent to the printer early in 1920.

General Statistics of Cities.

In addition to its reports giving financial statistics of cities, the Census Bureau issues reports on various phases of municipal governmental activities, in addition to those pertaining to finances, under the title "General Statistics of Cities." For 1918 the sub-

ject covered under this head was municipal markets, and on July 23, 1919, the complete report was published in the form of a 56-page bulletin. The subject is a timely one, and the information presented will be of value to cities that are contemplating the establishing of municipal markets.

Financial Statistics of States.

The report presenting financial statistics of States for the fiscal year 1918 has been completed. This report follows closely the lines of those giving financial statistics of cities. Work on the inquiry for the fiscal year 1919 is now in progress, and it is expected that copy for the report will be ready for the printer early in 1920.

Cotton and Cotton Seed.

During the fiscal year the Bureau of the Census conducted its regular inquiries in regard to cotton and cotton seed. In addition to an annual bulletin on cotton production and distribution for the season of 1917-18 and a pamphlet giving complete statistics of cotton ginned from the crop of 1918, there were issued 10 reports relating to cotton ginned to specified dates during the ginning season; 12 reports, at monthly intervals, on cotton consumed, imported, exported, and on hand, and active consuming cotton spindles; and another monthly series relating to cotton seed received, crushed, and on hand, and cottonseed products manufactured, shipped out, and on hand. The pamphlet presenting the final figures on cotton ginned from the crop of 1918 (together with data for earlier years) was distributed in time to be of use in making comparisons between the ginnings from the crop of 1919 and those for corresponding periods in earlier years.

Stocks of Leaf Tobacco.

Four reports on stocks of leaf tobacco held by certain classes of manufacturers and dealers were published at intervals of three months. In addition, Bulletin 139, "Stocks of Leaf Tobacco: 1918," was prepared and distributed. This bulletin, which presents data contained in the quarterly reports, with comparative figures for earlier years and various other statistical information pertaining to the tobacco industry, is the second of an annual series designed to compile for ready reference the statistics of the various phases of the tobacco industry published by the several Federal bureaus.

Official Register.

Preparations were begun during the latter part of the year for the compilation of the July 1, 1919, edition of the Official Register of the United States, which consists mainly of a directory of Federal employees, showing name, designation, compensation, etc.

SPECIAL AND MISCELLANEOUS LINES OF WORK.**Marriage and Divorce.**

Marriage and divorce statistics for the calendar year 1916 were collected in 1917. At the close of the fiscal year 1918 the preparation of the report had been substantially finished. A press summary was issued March 20, and the report itself was published April 7, 1919. The work of compilation and preparation for printing was delayed somewhat by war conditions.

Special Censuses of Population.

Special censuses of the population of Okmulgee, Ottawa, and Tulsa Counties, Okla., were taken, at local request and expense, in August, 1918, December, 1918, and January, 1919, respectively. A special census of Charles County, Md., was taken in March, 1919, at the request of the Secretary of the Treasury, in order to determine the effect of the recent influenza epidemic therein. The work was done in cooperation with the Public Health Service.

Statistics of Fats and Oils.

In December, 1918, the monthly collection of data in regard to the production, consumption, and stocks of fats and oils was discontinued by the Food Administration. In view of the need for reliable information concerning these commodities during the reconstruction period, the Bureau of the Census was authorized to collect and publish, quarterly during the calendar year 1919, similar statistics. This work is now in progress.

United States Life Tables.

As stated in my last report, the bureau computed a series of "life tables" supplementary to the series issued in 1916, exhibiting mortality conditions in certain areas for the years 1890 and 1901 and during the decennium 1901-1910. These tables, which provide valuable comparative data for use in studying changes in mortality rates, will be included in a new edition of the life tables, materially enhancing their value. In connection with certain of the original tables there will be given commutation columns, annuities, and premiums at various rates of interest; and the data on which the

various tables were based, the derivation of the theory, and an explanation of the methods of computing them will also be shown.

Special Investigation of Influenza Epidemic.

A compilation of data in regard to the mortality resulting from the epidemic of influenza and pneumonia during the last four months of 1918 was made for the States of Indiana and Kansas and the city of Philadelphia. The results, in the form of tables and graphs, are now ready for publication.

Thanks are due to the United States Public Health Service for its generous financial assistance in this work.

International Statistical Year Book.

At the request of the secretary of the International Statistical Institute at The Hague, the Bureau of the Census compiled detailed data relating to the United States as a whole and to the States individually for inclusion in the International Statistical Year Book (*Annuaire Internationale de Statistique*). The work was begun in February, 1919, and completed in the following June.

Statistical Directory of State Institutions.

During the fiscal year 1918 the bureau brought to substantial completion the compilation of a statistical directory of State institutions for the dependent, defective, and delinquent classes; but because of the great amount of war work and other current work, the publication of this directory has been delayed. It is now in the hands of the printer, however, and will be issued at an early date.

Searching of Census Records to Determine Ages.

During the fiscal year 2,315 searches of census records were made for the Pension Bureau, in order to determine the ages of applicants for pensions and increases of pensions. Other searches were made for genealogical purposes and for the purpose of supplying statements as to the ages of children affected by the child-labor laws. A vast amount of work was done in searching the records to establish the ages of men who had not registered for military service, but were believed to be within the prescribed ages.

Miscellaneous Information Supplied Other Governmental Agencies and Outside Organizations.

Numerous compilations of statistical information from the bureau's records were made in compliance with requests received from other Federal bureaus and from private concerns, consisting

chiefly of industrial statistics. Among the organizations for which they were made were the Chamber of Commerce of the United States; the U. S. Tariff Commission; the Office of the Surgeon General, War Department; the General Electric Co.; Power Plant Engineering (periodical); the Sinclair Refining Co., Chicago; the Southwestern Electrical & Gas Association, Dallas, Tex.; and the National Association of Cotton Manufacturers.

WAR WORK.

Census of Materials and Commodities for Use of War Agencies.

This work, which was authorized on April 8, 1918, was described on pages 92 and 93 of my report for 1918. It was undertaken to secure statistical information needed by the War Trade Board, the War Industries Board, the Shipping Board, the Food Administration, the Council of National Defense, and the Commercial Economy Board, in regard to the production and stocks on hand of the following-named classes of commodities, listed in the order in which work upon them was begun: Kapok fiber; jute; leather stocks; boots, shoes, and manufactured leather goods; silk; antimony; graphite crucibles; wool manufactures—machinery and production; and iron and steel products. For each of these classes of commodities, except leather stocks, boots, shoes, and manufactured leather goods, and graphite crucibles, only one report was made, beginning with that for kapok fiber, which referred to May 1, 1918. For leather stocks, monthly reports relating to the last day of each month, May to December, 1918, and quarterly reports, as of March 31 and June 30, 1919, have been compiled; for stocks of boots, shoes, and manufactured leather goods, the reports referred to the last day of each month, June to December, 1918, and to March 31 and June 30, 1919; and for graphite crucibles, two reports were issued, as of June 30 and September 30, 1918.

The collection of statistics of leather stocks and stocks of boots, shoes, and manufactured leather goods is of great importance as a conservation measure. The collection of these statistics, at quarterly intervals, was accordingly continued at the request of the War Industries Board and upon the recommendation of the war service committee representing the shoe and leather industries of the United States Chamber of Commerce. A simplified form of schedule was used for the quarterly statistics.

Statistics for all the war commodities covered by the several inquiries have been revised and rearranged for printing in a con-

densed form more convenient for reference. This is designed to be the final presentation of these statistics, and will constitute a permanent record of the census of war commodities.

Census of Commercial Greenhouses.

This inquiry was made at the request of the priorities division of the War Industries Board, which desired the information for use in connection with fuel restrictions.

Work Done for Provost Marshal General.

The 293,788 enlistments in the Navy, the Naval Reserve, the National Naval Volunteers, and the Marine Corps during the period from April 2, 1917, to June 30, 1918, were allocated by the Census Bureau. Estimates were prepared in July, 1918, of the number of British subjects in the United States subject to draft under the terms of the conventions concluded between this country and Great Britain, and also of the numbers of men in the United States from 18 to 20 and from 32 to 45 years of age, inclusive.

Determination of Ages of Registrants.

District attorneys and other officials of the Department of Justice were, at their request, supplied with age certificates for men who, although of military age, had not registered for the selective draft; and men requesting it were given statements showing their ages as indicated by the census records.

Liberty Loan Work.

In connection with the Liberty Loans made during the fiscal year, the Bureau of the Census aided the Treasury Department by sending out literature to various mailing lists.

Compilation of Statistics Relative to Foreign Countries for Peace Conference.

This compilation comprised statistics of the movement of cereals, salt, oil, coal, and wood on the railways and waterways of Russia in 1908, 1909, and 1910, the latest years for which figures were available; a tabulation showing the distribution of manufacturing establishments and wage earners in Austria by industries and factory-inspection districts; and statistics in regard to the exports and imports of countries and colonial possessions in Africa.

Information for U. S. Shipping Board.

At the request of the U. S. Shipping Board, detailed tables were prepared showing the population and value of agricultural products within a radius of 100 miles of each of 28 cities located on the Atlantic, Pacific, and Gulf coasts.

Miscellaneous War Work.

In addition to the foregoing, the Census Bureau performed numerous small amounts of war work for the Post Office Department, the Navy Department, the Department of Labor, the Bureau of Foreign and Domestic Commerce, the Fuel Administration, the Federal Trade Commission, the Telephone and Telegraph Administration, the Office of the Chief of Engineers, the General Engineer Depot, the Office of the Director of Military Aeronautics, the Emergency Fleet Corporation, the Railroad Administration, the War Industries Board, the War Trade Board, the Capital Issues Committee, the Central Statistical Clearing House, the Employment Service, the Reconstruction Survey, the War Service Committee of the Rubber Industry of the United States, and the American Electric Railway Association War Board.

Members of Force Enlisted and Drafted Into Military and Naval Services.

During the fiscal year 25 office and field employees of the Census Bureau entered the military and naval services (not including those who joined as Army field clerks). The total number who entered those services from the outbreak of the war to the signing of the armistice was 79.

PREPARATIONS FOR THE FOURTEENTH CENSUS.

Fourteenth Census Law.

As set forth in my annual report for 1918, a bill to provide for the Fourteenth and subsequent decennial censuses was drafted by the Census Bureau and submitted to the House Committee on the Census. The bill was passed by the House of Representatives July 2, 1918, and by the Senate, with amendments, January 14, 1919; the conference report was adopted by the Senate February 28, 1919, and by the House March 3, 1919; and the bill was approved by you on March 3, 1919. In many respects it follows the lines of the Thirteenth Census legislation, but there are departures in regard to a few important features and numerous unimportant ones. The most significant points of difference are as follows:

Section 1.—Insertion of provision for census of forestry and forest products.

Section 6.—Reclassification of clerical salaries, so as to provide a much larger number of classes, differing from each other by only \$60 per annum between \$900 and \$1,440, and by \$120 per annum between \$1,440 and \$1,800; increase in compensation of clerical

and subclerical employees generally; and provision for preference to honorably discharged soldiers, sailors, and marines, and their widows, in making appointments to positions in all executive departments and independent governmental establishments.

Section 7.—Provision, applying to Federal service generally, requiring Civil Service Commission to examine applicants temporarily absent from the places of their legal residence without requiring them to return for the purpose of examination; and provision authorizing selection of temporary Census employees from reemployment registers established by Executive order of November 29, 1918.

Section 8.—Omission of provision for securing information in regard to unemployment on census date and during preceding calendar year and in regard to Civil War veterans; insertion of provision for obtaining information as to encumbrances on homes and farms; omission of provision for enumeration of inmates of institutions for dependent, defective, and delinquent classes (this inquiry to be made after close of census period); inclusion of inquiry as to sex of farm operators; amplification of irrigation inquiry; and addition of drainage inquiry.

Section 9.—Provision for appointment of supervisors by Secretary of Commerce, upon recommendation of Director of Census, instead of by President, by and with advice and consent of Senate.

Section 20.—Change of census date from April 15 to January 1; reduction of minimum size limit for cities in which enumeration must be completed within two weeks, from 5,000 to 2,500.

Sections 21-24.—These sections, which provide penalties for violations of the Fourteenth Census act, have been so drawn as to make them more effective and more readily enforceable than the corresponding sections of the Thirteenth Census act.

Section 31.—Provision for mid-decennial census of agriculture, to be taken in 1925 and at 10-year intervals thereafter.

Section 32.—Provision for biennial census of products of manufacturing industries, beginning in 1921.

Joint Advisory Committee of American Statistical and Economic Associations.

At my invitation, under date of November 18, 1918, the presidents of the American Statistical and American Economic Associations appointed a joint committee to advise the Director of the Census and the Department of Commerce in connection with the

work of the Fourteenth Census. This committee was composed of six members, namely:

Representing American Statistical Association—W. S. Rossiter, chairman, formerly chief clerk, Bureau of the Census, now president Rumford Press, Concord, N. H.; Prof. Carroll W. Doten, Massachusetts Institute of Technology; Dean Edwin F. Gay, Harvard University.

Representing American Economic Association—Prof. Wesley C. Mitchell, Columbia University; Prof. E. R. A. Seligman, Columbia University; Prof. Walter F. Willcox, Cornell University.

The joint advisory committee has thus far held six meetings. It has given very careful consideration to all phases of the census work thus far planned, and has made a number of helpful recommendations. The members of this committee have rendered valuable assistance in connection with the preparatory work of the Fourteenth Census.

Field Force.

Continental United States (exclusive of Alaska) was divided into 372 supervisors' districts. These districts, outside the large cities, were as a rule coextensive with the congressional districts; and each of the large cities was placed under the charge of a single supervisor, with the exception of New York City, which was divided into four districts.

At the Thirteenth Census the enumeration was made as of April 15, and at earlier censuses as of June 1, but under the existing law the next and subsequent censuses will be taken as of January 1. This necessitates the appointment of the supervisors at an earlier date than heretofore, and with the least possible delay.

Under date of March 17, 1919, the bureau issued a press notice announcing the date of the coming census, the approximate number of supervisors to be appointed, and the method of their appointment, and quoting the above instructions. Approximately 5,500 persons were supplied, upon request, with application blanks for the position of supervisor, similar to the forms used by the Civil Service Commission for "nonassembled" examinations; and about 2,200 of these applications were filled out and returned to the bureau. A suitable scheme of rating was devised, the papers were graded, selections were made, and a list of candidates recommended to me for appointment; and during August the appointments were made and announced through the public press.

The enumerators will be selected by the supervisors, with the approval of the Director of the Census. Each candidate will be required to undergo a practical test.

Office Force.

It is estimated that the total office force of the Fourteenth Census will reach at its maximum about 4,000, as against 3,738 at the last census. The estimated increase is proportionally smaller than the increase in the work to be done, but it is expected that certain changes in organization, improvements in methods, and developments in tabulating machinery will make possible some increase in the average amount accomplished per employee.

Of the 4,000 officials and employees who will compose the census force when at its maximum, between 3,000 and 3,500 will be temporary clerks. Most of these clerks will be appointed as the result of special examinations to be conducted by the Civil Service Commission this fall throughout the United States; and the remainder will be secured (1) by selection from the reemployment registers of the Civil Service Commission established under authority of the Executive order of November 29, 1918, as amended April 30, 1919; (2) by selection from the registers maintained by the commission for the departmental service generally; and (3) by transfer, reinstatement, etc., under the civil-service rules.

The office force on August 31, 1919, comprised 23 officials, 717 clerical employees, 39 subclerical employees, 30 mechanical-laboratory employees, and 42 special agents for general field work, etc., a total of 851. In addition, there were employed throughout the cotton belt 694 local special agents to collect statistics of cotton and cotton seed. These agents perform their work only at intervals and are paid on a piece-price basis.

Preparation of Schedules, Etc.

The various schedules, instructions, and other forms to be used at the coming census have been prepared, and most of the population and agricultural schedules have been distributed to the supervisors. In connection with the preparation of the agricultural schedule, the division of agriculture held numerous conferences with representatives of the various governmental departments interested in agricultural statistics, as well as with professors in agricultural colleges, and representatives of agricultural periodicals and of farmers' associations. As a result, a general farm schedule was formulated which has been very widely indorsed

and has received the unqualified approval of the joint advisory committee of the American Statistical and Economic Associations.

Encumbrances on Homes and Farms.

Section 8 of the Fourteenth Census act contains a provision, inserted by the Senate, for ascertaining the amount of encumbrances on mortgaged homes occupied by their owners, of which in 1920 there may be approximately 4,000,000. In order to obtain a part of the information required—that relating to the market value of the home, the amount of encumbrance, and the annual rate of interest—it will be necessary to use a special schedule. It is estimated that the additional cost of collecting and compiling this information will be at least \$1,000,000.

Outlying Possessions.

The Fourteenth Census act provides for censuses of Alaska, Hawaii, and Porto Rico, to be taken by the Bureau of the Census, and also for censuses of Guam, Samoa, and the Panama Canal Zone, to be taken by the respective governors of those possessions in accordance with plans prescribed or approved by the Director of the Census. In taking the census of Alaska the Bureau of the Census will cooperate with the Bureau of Education. The work will be done under the direction of William T. Lopp, in charge of the Alaskan division of the Bureau of Education. Arrangements are being made, through the War and Navy Departments and the Panama Canal officials, with the Governors of Porto Rico, Guam, Samoa, and the Canal Zone, for taking the censuses of those possessions.

Mechanical Equipment.

Work in mechanical laboratory.—The object of the mechanical laboratory, to have produced or to have on hand at the close of the fiscal year 1919 all parts entering into the construction of certain tabulating machinery for the work of the Fourteenth Census, has been practically attained.

Five automatic tabulating machines have been completed and tested, of which four are in actual use; and the remainder of the equipment of tabulating and sorting machines will be completed on or before February 1, 1920.

The original estimates pertaining to the card sorting machines took into consideration merely the work of overhauling. It was later found expedient to introduce some radical changes in design and method of operation, and the result has been the production of a practically new and much more efficient machine.

Integrating counter.—In my last two reports I have referred to the progress of the development of an “integrating counter”—that is, a counter which will record and add numbers instead of mere units, thus performing automatically the work done by the operator of an adding machine—for use in tabulating certain classes of census data. The numbers will be indicated on cards by punch marks, the cards will be fed into the machine, and the numbers will be automatically totalized. Several sets of figures can be totalized at the same time. The principal advantage to be derived from the use of the integrating counter lies in the facility with which the data may be regrouped or rearranged.

Work on the integrating counter, which began on July 6, 1917, is still in progress. The first model has been completed as an experimental machine, and it has added and recorded numbers as indicated on punched cards at the rate of from 20,000 to 25,000 cards a day. A complete set of drawings and all patterns necessary for manufacturing this type of machine have been made.

A tentative card system for tabulating part of the manufactures census has been developed and will be tested.

BUREAU OF FISHERIES.

(Dr. HUGH M. SMITH, *Commissioner*.)

General Considerations.

While the work of the Bureau of Fisheries has been resumed along normal lines, following several years of special adaptation to war requirements, changed economic conditions resulting from war demand, and are receiving, serious attention.

It is quite apparent that, owing to food shortage and the active campaigns that have been waged for the purpose of offsetting that shortage, the use of aquatic products has acquired a more prominent place. That place can be enlarged and firmly established with marked benefit to the entire country. The bureau seeks to render this service. It is incumbent on Congress to authorize and support the effort.

All the vessels placed at the disposal of the Navy during the war have been returned, and the use that the Navy was making of the marine biological stations at Woods Hole, Mass., and Beaufort, N. C., has been relinquished.

The discrimination against this service in the matter of the attendance of technical employees of the bureau at meetings of societies should be removed.

The bureau deserves liberal, whole-hearted, unsuspecting treatment at the hands of Congress. It is rendering a large public service in a modest, loyal, effective manner. It more than pays its own cost in each of several ways. The direct revenue accruing to the Government through the operation and administration of laws affecting the fisheries of Alaska exceeds all the appropriations for the support of the bureau. The actual revenue returns for the operations of the calendar year 1918 will be found to exceed \$2,865,000, a sum which includes the tax levied on preserved salmon, fish oil, and fish fertilizer; the net sales of fur-seal skins taken on the Pribilof Islands; the net value of fox skins from the same locality; the returns from other Alaskan products and enterprises coming within the purview of the Department; and fines resulting from convictions for violations of law (the amount involved in this last item being small).

Of even more importance is the indirect and immeasurable value of the food fish produced and planted and the food fish rescued and restored to the waters. Any attempt to represent by dollars the value of the fish-cultural work would be futile; but it may be noted that if the hatcheries had been commercialized their output in the fiscal year 1919, together with the fishes salvaged from the overflowed lands of the Mississippi Valley, would have had a market value of not less than \$2,000,000.

No cognizance need be taken, in this connection, of the commercial value to individuals and industries of the biological and technical inquiries conducted by the bureau, although this is great.

Planting the Waters.

The comprehensive and varied operations of the Bureau of Fisheries in artificially propagating food fishes and planting them in suitable waters have reached a high degree of effectiveness. This work has had a gradual development in response to the urgent needs of the country, and meets with hearty public support because of the obvious benefits. There is demand for an extension of operations into sections not adequately covered by existing hatcheries, more particularly for the purpose of maintaining and increasing the supplies of common species like the catfishes and buffalofishes that can be produced in large quantities and are wholesome food.

The output of the fish-cultural stations during the fiscal year 1919 aggregated over 5,875,000,000 fish and fish eggs, most of

the latter being consigned to State hatcheries. The distribution was more extensive than ever before, exceeding the best previous record of 1917 by more than 715,000,000 and surpassing the year 1918 by 1,779,000,000.

Humpback Salmon in Maine.

In March, 1917, over 900,000 humpback salmon were planted in Maine waters, that had become unsuitable for the Atlantic salmon. This year the results of this introduction of a Pacific species are becoming apparent. It is reported that the fish have been seen in thousands in the Dennys and Pembroke Rivers, and the herring weirs in Passamaquoddy Bay have taken considerable numbers. The success of this experiment, for which there is every reason for the bureau to be gratified, is confirmed by the taking of nearly 400,000 eggs from humpbacks in the rivers named, which will be incubated at the hatchery at Craig Brook, Me.

Rescue of Stranded Food Fishes.

Too much stress can not be placed on the importance of the work of rescuing food fishes from the overflowed lands in the basin of the Mississippi River and its tributaries. All of the fish left behind when the freshet waters subside inevitably succumb to the drying or freezing of the pools or ponds in which they congregate unless rescue parties seine out the cut-off waters and restore the fishes to the main streams.

The aggregate number of salvaged fishes in the summer and autumn of 1918 was upward of 55,800,000, comprising practically every species of food fish of the Mississippi Valley. About 600,000 of the rescued fishes were distributed by the bureau's cars to outside waters; the remainder were deposited locally in the main river channels.

These operations for the season of 1919 have been resumed on a larger scale. Although the work is still in progress, there is already a substantial increase over 1918, and the fall season may close with a record of 125,000,000 rescued food fishes. A summary to the end of September is here given:

Headquarters.	Fish salvaged.	Headquarters.	Fish salvaged.
Friar Point, Miss.....	680,583	Meredosia, Ill.....	2,349,404
Canton and Clarksville, Mo.....	1,033,391	La Crosse, Wis.....	23,229,430
North McGregor, Iowa.....	15,233,267	Homer, Minn.....	28,800,510
Bellevue, Iowa.....	24,882,420		
Cairo, Ill.....	4,830,820	Total.....	101,039,825

The extent of this work may be better realized when it is stated that a score of hatcheries would be unable to produce fishes in number and size equal to those rescued. Nothing affecting the welfare of the fisheries of the Mississippi basin is of greater importance than the prevention of the losses that occur under natural conditions.

Loss of a Pacific Salmon Hatchery.

Among other items in the deficiency bill as reported to the House of Representatives September 11, 1919, is one providing \$50,000 for the reconstruction of the fish hatchery and other buildings at Baker Lake, Wash., which, with the exception of the bunk house and barn, were completely destroyed by fire on July 24, 1919. The disaster occurred at a most unfortunate time, as the season was but half over and the prospects for a large output were the brightest in years. Immediate steps were taken to prevent the failure of the work in progress, and as soon as the appropriation becomes available the reestablishment of the station in accordance with the most modern practice will be pushed to the utmost.

Relations with the States in Fish-Cultural Work.

The fish-cultural operations of the bureau bring it into close relation with the various States, some of which are engaged in similar work, while others depend wholly on the Federal Government for the stocking of their waters with food fishes. In several States field stations are jointly operated by bureau and State employees, the eggs being incubated at the hatcheries most conveniently located or from which the resulting fish can be most advantageously distributed.

During the fiscal year 1919, upward of 670,000,000 eggs of freshwater and anadromous fishes were donated to 24 States for hatching and distribution under their own auspices.

The shad hatchery at the mouth of the Susquehanna River, Md., has remained closed because of the continued failure of the State legislature to take action in harmony with the stipulations of Congress. The equipment of this station has been distributed among various other hatcheries.

Biological Investigation of Fishes.

Many of the vital problems connected with fisheries and aquiculture require for their elucidation the application of scientific methods of investigation, and questions are constantly arising which require the services of trained biologists. The branch of

the bureau that gives particular attention to these matters has during the past year conducted a number of investigations addressed to definite needs.

Among the fishes that have been the subject of special inquiry is the paddlefish of the Mississippi Valley, one of the important food fishes of our interior waters, now in danger of commercial extinction because of the intensity of the fishery conducted chiefly for its eggs, which are made into caviar. Up to the present time no efforts to hatch the paddlefish artificially have been successful, and there has also been lack of definite information regarding the natural spawning of the fish. In cooperation with the department of conservation of the State of Louisiana, there was undertaken during the past year a special study of the breeding habits of the paddlefish, and groundwork has been laid for further inquiry which it is hoped may save this valuable fish.

There have been instituted various investigations of the Pacific salmons. A special inquiry was directed to the very extensive practice of taking immature salmon by trolling and seining off the coasts of California, Oregon, and Washington. The conclusion was reached that any method of fishing which destroys immature salmon is so destructive and wasteful that it should be discontinued. The Department has communicated the results of the inquiry to the interested States and has indicated its readiness to assist them in determining the best means of meeting this menace to the salmon industry.

Shellfish Investigations.

Important scientific investigations have been devoted to oysters, mussels, and other shellfish. A study of great practical significance has been conducted in Long Island Sound, the scene of very extensive oyster-cultural operations, that have become seriously impaired by failure of the spat to set. In some sections more than half the grounds have ceased to be cultivated because of the small yield of oysters thereon, and for the past two years the set of spat has been entirely negligible. A temporary field laboratory has been maintained at Milford, Conn., and inquiries indicate that the wholesale death of spat in the shore waters may be attributable to pollution in the form of sewage and trade wastes. It has therefore been found desirable, in cooperation with the water laboratory of the Bureau of Chemistry, to make special studies of the nature and effects of the various pollutants.

Further investigations pertaining to the propagation, feeding,

and growth of oysters have been conducted in Great South Bay, Long Island; Narragansett Bay, R. I.; Barnegat Bay, N. J.; all in cooperation with the State authorities. In extensive oyster beds in the York River, Va., a serious affection has for several years rendered the oysters unmarketable. The malady consists of a green discoloration associated with a watery and lean condition of the meat. No cause or remedy has yet been found, but the investigation is still in progress and will be continued until definite conclusions are possible.

The sea mussel continues to be one of the great unutilized aquatic resources of the north Atlantic coast. While the food value of this mollusk is well recognized, there has been curious delay in its general adoption into the dietary, even in the regions where it abounds and is best known. In continuance of its task of popularizing this valuable food article, the bureau has conducted a survey of the mussel beds of Maine, southern New England, and Long Island Sound, with a view to demonstrating the availability and abundance of mussels for use in a fresh condition and for preserving.

Between Portland and Eastport, Me., in six sections where the most important grounds are located, the survey showed upward of 1,200 acres of natural mussel beds, estimated to contain over 1,275,000 bushels. The best beds yield from 2,500 to 5,000 bushels to the acre. Leading packing houses on the north Atlantic coast are giving special attention to the canning of mussels, and there is reason to believe that the development of the mussel industry will not be long delayed and will add materially to the wealth and food supply of the country.

The practical operations in the artificial propagation of fresh-water pearly mussels, conducted at various points in the Mississippi Basin, resulted in the inoculation of 137,000,000 glochidia on suitable fish hosts. The output was less than in the previous year, owing chiefly to disturbed labor conditions. Investigations and experiments in the field of fresh-water mussels have continued to yield valuable results bearing on artificial propagation.

Among the crustacean shellfishes, the spiny lobsters of California and of Florida have been the subjects of studies addressed to their habits and growth. Upon the basis of the information furnished by the bureau to the State authorities of Florida, more effective protection has been provided by the legislature. Comprehensive reports on the life history of the blue crab and on the blue-crab fishery have been issued and are expected to be useful

to State officials concerned with the protection of the crab and the maintenance of the fishery. It may be noted with gratification that an increased catch of blue crabs in Chesapeake Bay has recently been had; and it is conceded that this has been due to the adoption of wise measures of conservation based on the bureau's investigations and recommendations.

Use of Fishes in Controlling Mosquitoes.

A novel and highly important extension of the scientific activities of the bureau has been the eradication of mosquitoes and the prevention of malaria in the vicinity of Army cantonments in cooperation with the Public Health Service. The duty devolving on the bureau in this cooperative work was the propagation of mosquito-eating fishes, their distribution in waters infested with mosquito larvæ, and the maintenance, in bodies of water that could not be drained, of conditions that promoted the effectiveness of small fishes in the control of mosquitoes. The most extensive operations were conducted in the vicinity of Camp Hancock and the city of Augusta, Ga., and the success there attained was so marked as to constitute a distinct advance in antimalarial work. The Surgeon General of the Public Health Service has expressed his appreciation of the assistance rendered, and has authorized the publication of a report setting forth the methods followed and the results achieved by the bureau in the extra-cantonment zone at Camp Hancock.

Increased Utilization of Aquatic Products.

The Bureau of Fisheries has continued to render a large and important service to the fishing industry, the fish trade, and the public generally through its efforts to popularize neglected fishes and find uses and markets for wasted water resources. The work has consisted of practical demonstrations, technical investigations and appropriate publicity, and has been made possible chiefly by the allotment by the President of funds placed at his disposal for the national security and defense. Undertaken primarily during the war to increase the supplies of food and permit the exportation of meats to Europe, this campaign has, of course, equal value as a means of reducing living costs and of giving aquatic foods a larger permanent place in the national dietary.

Appeal has been made to Congress for adequate funds for carrying on this work, and meanwhile it has been necessary to greatly curtail all activities and to abandon some that were rendering important benefits to large numbers of people. Attention is asked to Appendix B, relating to this subject.

New Sources of Aquatic Leather.

Material progress has been made in finding and utilizing new sources of leather from the skins of aquatic animals. The feasibility of producing commercial leather from such animals has been amply demonstrated, and the actual business has passed beyond the experimental stage, although work remains to be done in perfecting methods and in making generally known to the manufacturers of leather goods the availability and merits of the new products.

Many samples of aquatic leathers and of various articles made therefrom have been submitted to the bureau by private firms and have been favorably criticized by disinterested persons. Among the manufactured objects made from fishskins that have come to the attention of the Department are traveling bags, brief cases, pocketbooks, belts, shoes, and ladies' hand bags. It is reported that the demand for shark leather for traveling bags is now greater than the supply, and plans on a very extensive scale are being executed for increasing and maintaining the output of shark hides by the establishment of special shark fisheries on the Atlantic, Pacific, and Gulf coasts. Excellent leather for shoes is also being derived from sharks.

The duty imposed on the Department by Congress in June, 1917, when there was made available the sum of \$10,000 "for developing by the Bureau of Fisheries, in cooperation with the Bureau of Standards, new aquatic sources of supply of leather" may be regarded as having been accomplished, and private enterprise will now undoubtedly do what may be necessary to develop and give permanency to the industry.

Alaska Fisheries Service.

The usual duties involved in the administration of the Alaskan fisheries have been performed. The corps of agents and wardens was supplemented by a stream-watchman patrol inaugurated in the season of 1918, consisting of 10 men engaged for the active fishing season. In addition to the enforcement of the laws and regulations governing fishing, the inspection of private salmon hatcheries and the taking of the census of red salmon entering Wood River, special investigations of a scientific and practical nature were made; work was done in opening up salmon streams for spawning; public hearings were held at Seattle concerning commercial fishery operations and conditions in the Copper and Yukon Rivers and all streams of southeastern Alaska; and detailed statistics of the fishery industry were compiled.

The returns for 1918 show a larger production than that of 1917, which far exceeded previous records. The number of persons employed in all branches of the industry was 31,213, an increase of 1,722 over 1917; the capital invested was \$73,750,789, an increase of \$18,813,240; and the value of products marketed was \$59,154,859, an increase of \$7,677,879. The increased value of products was chiefly owing to the larger pack of canned salmon in 1918 resulting from the strenuous effort to meet the food shortage. The canned-salmon industry surpassed all records, the pack reaching the grand total of 6,605,835 cases of forty-eight 1-pound cans, valued at \$51,041,949. Of this, approximately three-eighths of the quantity and nearly one-half of the value represented red salmon. The salmon sold in a fresh, frozen, salted, and smoked condition brought the total value of the salmon to \$53,514,812. Thus 50 years after the acquisition of Alaska, the salmon output alone was worth seven and one-half times the purchase price.

The Alaska fisheries service merits liberal appropriations from Congress. The corps available for enforcing the laws and regulations and for carrying out other obligations arising out of administrative responsibility is still inadequate. The vast extent of the salmon industry and the heavy drains that are being made on the supply necessitate an enlarged personnel for maintaining and extending the patrol, for making special investigations, and for conducting various lines of constructive work in the interest of the industry. Several large hatcheries should be established in regions of most extensive fisheries, such as Karluk and Nushagak.

The following is a summary of results of efforts of the Bureau of Fisheries to introduce the Scotch method of curing herring in Alaska during 1917 and 1918. The figures for 1919 are not yet available.

Total cost of work, about.....	\$12,000
Pack, as follows:	
1917, 7,622 barrels (1,905,000 pounds).....	114,330
1918, 38,977 barrels (9,744,250 pounds).....	748,606
Total value.....	862,936

Alaska Fur-Seal Service.

The calendar year 1918 was the first after the expiration of the law imposing a close time on the commercial killing of seals on the Pribilof Islands. The quota of skins that might be secured was fixed at 35,000 and the number actually taken was 34,883, all but 1,002 of which were procured by August 10, when operations have usually ceased because of the beginning of the stagy season.

For the season 1919 the quota was tentatively fixed at 35,000, and the number of skins actually secured to August 10 was 25,381. The conditions of the herd warranted the taking of a considerably larger number of skins, but the scarcity of experienced men, combined with the increased labor involved in removing and handling the skins of the larger seals, to which special attention was given, reduced the season's output. The epidemic of influenza which ravaged Alaska necessitated the establishment of a quarantine to protect the susceptible natives of the seal islands, and it became impossible to carry out the plans for obtaining additional labor.

In an effort to improve transportation facilities on the seal islands three tractors and a number of wagons for trailers have been sent this year. This equipment will not only be of the greatest value in transporting sealskins from the killing grounds to the salt houses, but will furnish the means of hauling carcasses from the killing grounds to the newly established by-products plant. The tractors will also be very useful in constructing roads.

With a special appropriation made by Congress, there has been purchased a power lighter for use at the Pribilof Islands and between the islands and Unalaska, the nearest commercial port, 250 miles distant. This vessel will be equipped with wireless apparatus, and a rapid-fire gun for use in any emergency that involves the protection of the seal herd.

Most of the supplies required for the Pribilof Islands and the products derived therefrom were transported on the steamer *Roosevelt*, which made three voyages between Seattle and the islands during the year. On the final voyage the vessel did not leave the islands until December 12, which appears to be the latest recorded date for any vessel in that part of Bering Sea. Certain supplies and products were carried by the Coast Guard cutter *Bear* and the naval radio tender *Saturn*. The lighthouse tender *Cedar* of this Department transported heavy pieces of machinery for the by-products plant.

The very trying service required of the steamer *Roosevelt* during the years actively engaged in the Alaska work, combined with the heavy duty that the vessel had performed in her memorable Arctic career, developed defects the repair of which would have necessitated a large outlay out of proportion to her total value. She was, therefore, sold at public auction in Seattle on July 15, 1919, for the sum of \$28,000.

A very comprehensive account of the fur-seal service in 1918 is contained in a special report on Alaska fisheries and fur industries published by the Bureau of Fisheries. The native wards of the Government and their physical, mental, and financial condition are discussed at length.

There is need for an enlarged administrative personnel on the Pribilof Islands, including a superintendent and a biologist. With the acquisition of a vessel for interisland service, the islands need not hereafter be managed as distinct entities, but should be affiliated under one coordinating head. Vital scientific and technical problems are involved in the management of the rapidly increasing seal herd, and the creation of the position of biologist is demanded.

Alaskan Seal Herd.

The fur seals resorting to the Pribilof Islands are continuing to increase under the beneficent protection afforded by the international agreement prohibiting pelagic sealing. The only untoward feature has been the accumulation of older male seals far beyond the requirements for breeding purposes during the 5-year close time. Fortunately, the bureau has found a means of utilizing to the pecuniary advantage of the Government the skins of surplus bulls, and the gradual elimination of disproportionate elements is proceeding.

The seal census of 1918 gave 496,611 animals of all ages as composing the herd on August 10, after the close of the regular killing season. The corresponding census for 1919, the results of which have been communicated by telegraph and are subject to slight revision, showed 524,260 seals in the herd as of August 10, in addition to the 26,383 seals that had been taken for their skins subsequent to the previous enumeration. The numerical strength of the herd increased about 11 per cent from 1918 to 1919. The detailed figures for 1919 are as follows: Breeding females, 157,172; new-born pups, 157,172; yearlings of both sexes, 92,891; 2-year-olds of both sexes, 66,352; males 3 years old, 13,576; males 4, 5, and 6 years old, 20,080; harem bulls, 5,158; idle and surplus bulls, 11,859; average harem, 30.47.

Marketing Products of the Seal Islands.

During the fiscal year ended June 30, 1919, there were two sales of sealskins held October 7, 1918, and April 28, 1919. Fox skins were also sold at the October 7, 1918, sale.

The sealskins numbered 12,002, and were dressed, dyed, and machined before being offered for sale at public auction in St. Louis, Mo. The gross proceeds were \$777,931; the expenses, including cost of preparation of skins, transportation, agents' commission, discount for cash, etc., aggregated \$233,195.52; the net proceeds were thus \$544,735.78.

The fox skins sold at public auction in St. Louis numbered 692 blue and 19 white pelts. The gross receipts were \$58,179.50, the expenses were \$6,280.86, and the net proceeds were \$51,898.54.

On September 10, 1919, there were sold at St. Louis by Messrs. Funsten Bros. & Co., agents of the Department of Commerce, 9,055 dressed, dyed, and machined fur-seal skins and 665 blue and 30 white-fox skins. The total gross price realized was approximately \$960,000. The sealskins averaged \$91.35, an advance of 30 per cent over the prices realized last April. The blue foxes averaged \$195.90, an advance of 135 per cent over prices realized last October, when the last sale of Government blue foxes occurred. The market was strong, bidding was spirited throughout, and there was a very large attendance of buyers. The results of this sale are highly gratifying.

A noteworthy development of the fur-seal industry during the year has been the demonstration of the high value of the skins of old male seals usually designated as "wigs" and the creation of an active demand for such skins. At the public auction sale in October, 1918, the best prices received for any sealskins were for "wigs," an experimental lot of which brought \$75 each. At the sale in April, 1919, a considerable number of "wigs" were offered for sale in a dressed and dyed condition; these sold for \$77 to \$88 each, while the average price for all skins was \$66. It should be noted that formerly "wigs" in the raw state were regarded as having little or no value in the London market.

The seal-island natives continue to collect old seal bones at times when they have no other work. They are encouraged to do this, and are paid for their labor. In 1919 about 300,000 pounds of bones were gathered, sacked, delivered on board Government vessels, and landed in Seattle and San Francisco. The net proceeds amounted to \$3,891.03.

It is estimated that, when the entire take of sealskins for the calendar year 1918 shall have been dressed, dyed, machined, and sold, the net revenue to the Government, based upon the proceeds obtained at the sale of September 10, 1919, will be in excess of \$2,450,000. To this should be added an approximate

net revenue of \$123,000 for the sale of fox skins. It is safe to say that, when the proceeds of the sales of bones, oil, and other by-products are taken into account, the net revenue for the products of the calendar year 1918 will reach a sum in excess of \$2,600,000. This would more than pay all expenses of every nature connected with the administration of the Pribilof Islands, the Alaskan salmon fisheries, and the care of the minor fur-bearing animals of Alaska for a period of 12 years.

The accumulated experience of the Department under the contract with Funsten Bros. & Co., of St. Louis, Mo., for dressing, dyeing, machining, and selling fur-seal skins and for selling fox skins from the Pribilof Islands has proved very beneficial to the Government. The contractors have rendered highly satisfactory service in every feature. They have not only scrupulously observed every expressed and implied obligation of their contract, but they have willingly assumed other responsibilities and duties which, while meaning nothing to them in a pecuniary way, have meant much to the Government. The service rendered has been of a high order; the quality of the finished products has been superior to the best obtainable elsewhere; the methods of conducting the public auction sales have deserved and received the approbation of the entire fur trade; and the financial interests of the Government have been constantly safeguarded. The Government-owned furs have been in active demand and have brought the highest prices in the history of the fur business.

As a result of the profit to the Government under the contract the latter has been extended so as to expire on December 15, 1926.

Minor Fur-Bearing Animals of Alaska.

The minor fur-bearing animals of Alaska have received the usual attention, with assistance from special wardens whose services have been available through a reciprocal arrangement with the Governor of Alaska. There have been a number of prosecutions for violations of the regulations, and seizures of furs have been made from time to time. The furs thus confiscated have been sold at public auction and the proceeds covered into the Treasury of the United States.

There have been two modifications of the regulations: The use of dogs for pursuing and killing fur-bearing animals for which close seasons exist has been prohibited, and the open season on foxes in the region drained by streams flowing into the Arctic Ocean north of the sixty-eighth parallel of north latitude has been

extended 30 days, or until April 15. Fur-farming operations have been continued at a number of places along the coast and in the Yukon region, and some successful results have been reported.

Through the cooperation of postmasters, collectors of customs, shippers, and others, the usual compilations of statistics of furs shipped from Alaska have been made possible. The value of furs for the year ending November 15, 1918, was \$1,363,330, as compared with \$1,064,249 for the previous year, due largely to the advance in the price of furs. With the exception of lynx, there was also an increase in the number of pelts of the more important species of fur-bearing animals shipped from Alaska. The more notable increases were of ermine, foxes, mink, muskrat, land otter, wolves, and wolverines.

Fishery Legislation Needed.

The most urgent requirement in connection with the fisheries of Alaska is for a new code covering the salmon fisheries to replace the existing obsolete and inadequate laws. Proper administration, efficient regulation, rational conservation, and fair revenue to the Government can not be secured unless the salmon laws are revised to meet present conditions. Legislation is desired also to lodge the administration of the minor fur-bearing animals of Alaska elsewhere than in the Bureau of Fisheries, an agency whose legitimate functions are entirely irrelevant to land mammals.

There is urgent need also for amendment of the law of June 14, 1906, prohibiting aliens from engaging in the fisheries of Alaska. The defects in the present law result in the violation of the spirit of the law and permit the actual exploitation of the fishery resources of Alaska by alien fishermen operating independently and having no regard for laws or regulations designed to perpetuate the industry.

The prevention of waste in the Alaskan halibut fishery and protection to the halibut grounds should be promptly brought about by legislation in accordance with the recommendation of the American-Canadian Fisheries Conference. Legislation to be effective should be uniform in the United States and Canada.

BUREAU OF LIGHTHOUSES.

(GEORGE R. PUTNAM, *Commissioner.*)

Cooperation with Navy and War Departments.

The lighthouse vessels and stations operated under the jurisdiction of the Navy Department during the war were returned to the Lighthouse Service July 1, 1919.

The Lighthouse Service, in addition to the work done by the tenders directly under the orders of the War and Navy Departments, during the war provided facilities at various depots for the berthing of naval vessels, and at the general lighthouse depot at Tompkinsville, N. Y., provided special coaling facilities and quarters for naval detachments. Additional buoys were placed, and other changes in aids to navigation were made, as required. Repairs to naval patrol boats were made at various points, and various buoys, moorings, and other appurtenances were transferred to or purchased for the Navy and War Departments. The Lighthouse Service also cooperated with the Navy Department and Treasury Department in connection with improvements in coast-communication facilities by telephone and radio and in the transmission of reports received from light stations and considered of possible military value.

Because the tenders of the Lighthouse Service are particularly well equipped for handling buoys, moorings, etc., and their officers are thoroughly familiar with the coast line and waters of the United States, these vessels were effectively used by the War Department in mine-planting operations and by the Navy Department in laying submarine-defense nets, etc., during the war and later in removing these defenses.

Aids to Navigation.

In addition to this cooperation with the military service, the regular work of the Service in maintaining and improving aids to navigation was actively carried on during the year. During the fiscal year three important light and fog-signal stations were established from special appropriations—namely, at Lorain Harbor, Ohio, at the end of the west breakwater, to mark the entrance to the harbor; at Sand Hills, Mich., to mark a dangerous locality on the south shore of Lake Superior; and at Lime Kiln, San Juan Island, Wash., to mark an important point on the route from Puget Sound to British Columbia and Alaska.

Three unwatched acetylene lights were established in the Caribbean Sea to mark the traffic lane between the Gulf coast of the United States and the Panama Canal through Yucatan Passage. This important maritime track lies between low coral reefs and islands in the northwestern part of the Caribbean Sea. The work was done in cooperation with the Navy Department, which furnished a gunboat to transport the working party and materials.

An unwatched acetylene light was established at Dog Island, Me.

During the year 36 new aids were established in Alaska, including 19 light stations, 1 gas and bell buoy, and 16 other aids. The total number of aids to navigation in Alaska at the end of the fiscal year was 475, being a net increase of 36 over that of the preceding fiscal year, and the total number of lights was 180. The appropriation by the sundry civil act approved July 19, 1919, of \$75,000 for aids to navigation in Alaska has permitted active steps toward further safeguarding those dangerous waters.

The work to be done was already listed, ready, when the money became available and instructions to proceed were given by telegraph in order to accomplish as much as possible during the present season.

A total of 736 new aids to navigation were established during the year, including 178 fixed lights, 6 float lights, 1 light vessel, 73 gas buoys, and 469 other aids, the total number in commission on June 30, 1919, being 16,075, a net increase of 400 over the preceding fiscal year.

Considerable work was done during the fiscal year in repairing damage to aids to navigation caused by ice floes during the winter of 1917-18, especially to screw-pile structures in Chesapeake Bay and Potomac River. Much was also done in repairing hurricane damage to aids in the Gulf of Mexico, reconstructing stations, so far as practicable, in a manner calculated to better withstand future destruction.

Various special works were actively in progress during the year, including the establishment of important new light and fog-signal stations and lighthouse depots, improvements in systems of fixed aids and buoyage, etc.

Improvement in illuminating and fog-signal apparatus of existing aids was continued. Fixed lights were replaced by flashing or occulting lights at 20 stations, including two light vessels; incandescent oil-vapor lights were substituted for oil-wick lamps at 4 stations; and acetylene or electric incandescent illuminant was substituted at 36 stations, including 5 light vessels and 2 buoys. The fog-signal apparatus at 7 important stations was improved by the substitution of air diaphones for less efficient apparatus.

General repairs required to maintain aids to navigation in efficient condition were continued, but insufficiency of funds prevented this work being done to the proper extent.

Damage to lighthouse property, estimated at \$13,500, was sustained on December 8, 1918, by a fire at Execution Rocks Light Station, N. Y. The fog-signal engine and machinery, also the tower, oil house, and dwelling, were damaged.

On March 11, 1919, a gas buoy burst while being tested at a lighthouse depot by means of hydrostatic pressure, injuring two employees, one of whom died later as a result of injuries received. The accident was carefully investigated and steps taken to insure the observance of precautions.

An earthquake and tidal wave of considerable intensity occurred in Porto Rico and vicinity on October 11, 1918. Lighthouse property was not seriously damaged, except at Point Borinquen and Point Jiguero Light Stations.

The mild winter of 1918-19 presented a great contrast to the severe weather of the preceding winter, and permitted the removal of buoys from their stations for the winter without loss or trouble, and in some cases buoys usually removed for the winter were kept on station throughout the year. This rarely happens in north Atlantic waters.

Vessels.

There is a very urgent need for the construction of additional vessels for the Lighthouse Service, to replace those worn out in service, those lost through various casualties, and to meet the considerable growth of the Service in recent years. A full statement of this situation is given in Appendix A to this report.

Relief Light Vessel No. 51, stationed on Cornfield Point light vessel station, Conn., was collided with and sunk by a barge in tow of a Standard Oil tug on April 24, 1919. The light ship went down in eight minutes after being struck. Good judgment and discipline on the light vessel were shown in the emergency. No injury was sustained by the crew. The lifeboat and log and fog-signal books were the only property of the light vessel saved. This vessel was of iron, built in 1892. The owner of the tow has been called upon to indemnify the Government.

Bush Bluff Light Vessel No. 97, was surveyed and condemned for sale, being in such a poor condition as not to warrant repairs. Bush Bluff Station is now marked by a gas and bell buoy, the bell being operated by carbonic-acid gas, a test installation of this apparatus.

The tender *Cedar* performed urgent special duty in connection with the influenza epidemic last fall. Physicians and nurses in

charge of a medical officer of the United States Public Health Service were carried to isolated localities in southeastern Alaska, principally native Indian villages.

Lighthouse Depots.

Construction of the lighthouse depot for the sixteenth district, at Ketchikan, Alaska, for which an appropriation of \$90,000 was made by act of July 1, 1918, was actively carried on during the year. On June 30, 1919, the wharf was about 95 per cent completed, and the entire work, including storehouse, shops, etc., about 35 per cent completed.

Important improvements are in progress at the general lighthouse depot, Tompkinsville, N. Y. The act of March 28, 1918, appropriated \$60,000 for repairs to the wharves. This work includes the removal of the old wooden wharf decks and construction of concrete decks with cast-iron pile columns and other improved features. In order to permit use of the wharves while improvements are in progress, the work is being done in three sections. The first section, the south wharf, was completed in February, 1919. It is expected that the second section will be completed about September, 1919.

In August, 1918, you allotted from your fund for national security and defense \$175,000 for improvement of coaling facilities at this depot, with particular reference to cooperation work with the Navy. This work is in progress, and it is expected will be completed about February, 1920.

The act of July 19, 1919, appropriated \$30,000 for extending and enlarging the machine shop at this depot, and plans are being prepared.

The act of June 12, 1917, appropriated \$21,000 for improving the office and laboratory at this depot. This work has been completed, except the installation of a heating system and other work of minor importance.

The act of July 1, 1918, appropriated \$85,000 for the construction of a depot for the second lighthouse district. A portion of the old marine-hospital property in Chelsea has been transferred as a site for this depot. The work is in progress, but the amount available is quite insufficient for the complete construction.

The act of June 20, 1918, authorized \$275,000 for improvements at the lighthouse depot at Portsmouth, Va., or establishing a new depot, but no appropriation has been made for this work. This is the principal depot of one of the largest lighthouse districts and is the headquarters for five tenders and two light vessels.

The facilities for berthing these vessels is entirely inadequate, and the efficient operation of the vessels is much hampered in consequence. The inadequacy of space for storing and handling buoys also causes delay and loss.

A new depot for the seventh lighthouse district, at Key West, Fla., is urgently needed for the efficient and economical handling of the work of the district. The present depot is located on property belonging to the Treasury Department, with naval coal sheds and piers on either side. The space allotted the Lighthouse Service for buoys and appendages is entirely inadequate. The depot consists of a wooden storehouse built on a wooden pier. There is no oil house at this depot, due to lack of space, and kerosene, gasoline, and other inflammable supplies have to be kept in the storehouse, constituting a constant menace of fire.

Suitable depot facilities at Honolulu for the nineteenth lighthouse district are also much needed, and an estimate has been submitted for this purpose.

Improvement of Apparatus and Equipment.

Radio equipment was installed on 28 light vessels and on 12 tenders during the fiscal year. At the end of the fiscal year 41 light vessels and 23 tenders had been equipped with radio installations.

The installation of telephones at light stations was continued during the year. This work was done by the United States Coast Guard under an appropriation to develop coastal communications, including connections with important light stations. On June 30, 1919, there were 139 light stations so connected.

Experiments and tests with various devices and equipment used in lighthouse work have resulted in developing improvements in the interests of efficiency and economy. Among these may be mentioned improvements in diaphone installations, resulting in simplicity of operation, reduced space required for machinery, and lowered initial cost. A new type of metal buoy was developed for use in defining shoal-water channels, being an improvement over wooden spar buoys, which are less conspicuous and more expensive to maintain. The stability of the type I, gas and bell buoy moored in the exposed waters of Alaska was improved.

On account of immunity from submarine boring insects the use of palmetto piles has been extended in southern waters.

An improved device for fastening moorings to buoys in the upper Mississippi River was tested and proved satisfactory.

Investigation of the use of radio for fog-signal purposes was interrupted by war activities, but is now resumed.

Personnel.

On June 30, 1919, there were 5,964 persons employed in the Lighthouse Service, including 125 technical, 156 clerical, and 5,683 employees connected with light stations, vessels, and depots. This Service is charged with the maintenance of aids to navigation along 47,300 statute miles of coast line and river channel.

The retirement system for the field service of the Lighthouse Service was put in effect upon the appropriation by Congress of the necessary funds by act approved November 4, 1918. By the same act the retirement law was amended to the extent that the provisions of the law do not apply to persons in the field service whose duties do not require substantially all their time. The effect of the retirement system has been very advantageous, both to the Service and the personnel, and at a moderate expense.

Saving of Life and Property.

During the fiscal year services in saving life and property were rendered and acts of heroism performed by employees of the Lighthouse Service on 111 occasions. Many of these acts were considered especially meritorious, and the employees were individually commended by me.

Administration.

The system of cost keeping for the Service was modified, reducing the amount of detail work required in district offices without sacrificing the essential data furnished. This modification was necessary in order that other important work might be kept up.

The Department approved regulations for the distribution of lighthouse publications on a sales basis, pursuant to act of Congress of June 20, 1918. This was put in effect January 1, 1919. Sales agencies have been established at the principal ports. Returns of sales are made to the Superintendent of Documents, Washington, D. C., who supplies the necessary copies of the publication.

The appropriations for the maintenance of the Lighthouse Service for the fiscal year 1920 are \$6,625,000, being \$474,570 in excess of those for the preceding fiscal year, and include \$45,000 for retired pay. In addition, there are special appropriations

aggregating \$794,400, including \$440,000 contained in the deficiency act of November 4, 1918.

The appropriations for the maintenance of the Lighthouse Service for the fiscal year 1920 were \$1,054,600 less than the estimates submitted, and additional funds will be necessary for even the minimum maintenance of the Service during this fiscal year.

During the last fiscal year \$774,000 was transferred from Navy Department appropriations to make good deficiencies in the maintenance of the Lighthouse Service, but as the vessels and stations were transferred back on July 1, 1919, funds will not be available from the similar provisions in the naval appropriation act this year.

Systematic inspections have been continued in the various lighthouse districts of the technical work, business methods, and property accounts.

Special Legislation Needed.

The act of August 29, 1916, authorizing the President to transfer to the Navy or War Department portions of the Lighthouse Service when there is a national emergency, should be amended so as to definitely define the status of the personnel transferred. All persons so transferred who serve on vessels or at stations where they are exposed to the risks of war, should have a suitable military status, and be entitled to all relief provided by legislation for those in the military services. Although the personnel transferred during this year were, under rulings of the Treasury Department, given the benefits of the war-risk insurance, there was considerable conflict in decisions as to their standing under the act of August 29, 1916. All of the personnel were in an indefinite and anomalous position in their relations with the military and naval personnel. Specific recommendation is deferred until conditions become more settled. In any future transfer of vessels there should, if practicable, be more definite understanding as to the extent to which tenders are to be diverted from their lighthouse duty. The upkeep of the system of aids to navigation requires every effort of the present equipment of tenders, and their efficient maintenance is even more important in time of war than in normal times.

Legislation is recommended to cover adjustment of claims by lighthouse employees for loss or damage to personal property,

such as clothing, furniture, etc., caused by storm, tidal waves, collisions, or fire at light stations, depots, and on vessels. Such provision should be made in justice to these employees engaged on hazardous duty. By act of June 17, 1910, it was provided that claims against the Government for damages not exceeding \$500 arising out of collisions for which lighthouse vessels are responsible be determined and settled by the Commissioner of Lighthouses. This provision has enabled the Government to adjust claims promptly and has relieved Congress of the annoyance of many petty claims; and similar legislation covering losses of personal property by lighthouse employees would be advantageous to the Government and result in more equal justice to employees.

Legislation is also recommended providing for medical relief for lighthouse keepers without charge at other than hospitals and stations of the Public Health Service. The hospitals and stations of the Public Health Service, at which free treatment is now provided for lighthouse keepers, are obviously inaccessible for a large number of keepers.

Legislation is recommended authorizing the establishment and maintenance of post-lantern lights and other aids to navigation on the Yukon River and its tributaries, Alaska. The waters of the Yukon delta are already being marked, but congressional authority is required for the Lighthouse Service to extend its jurisdiction to the nontidal waters of these rivers. Navigation of the Yukon River is increasing, and as it is navigable for a long distance many lights and day marks are required.

An appropriation of \$50,000 is strongly recommended for establishing and improving aids to navigation in the Virgin Islands of the United States, West Indies, and adjacent waters. This work was authorized by Congress by the act approved June 20, 1918 (40 Stat., 608), but no appropriation has been made. The Naval Governor of the Virgin Islands in a letter dated July 15, 1919, strongly urged that this matter be given the serious consideration it deserves in order to facilitate and safeguard the very large amount of shipping in these islands.

The act of June 20, 1918, providing for voluntary retirement at the age of 65 after 30 years' service, and compulsory retirement at the age of 70, for certain classes of employees of the Lighthouse Service has proved beneficial both to the men eligible to retirement and to the Service in replacing such men with

younger and more capable employees. Still greater efficiency, however, will result and hardship to deserving employees will be avoided if the same benefits are extended to persons who become disabled from efficiently performing their duties by reason of disability incident to their work, such disability being distinct from that caused by injury received in the line of duty, for which compensation is now provided by law. Legislation to this end is recommended.

Appropriations for Special Works.

The sundry civil act approved July 19, 1919, made the following appropriations for special works in the Lighthouse Service:

Restoring and improving Execution Rocks Light Station, N. Y.	\$10, 000
Rebuilding Point Jiguero Light Station, P. R.	24, 000
Improving the light and fog signal at Manitowoc Breakwater Light Station, Wis.	9, 000
Completing the removal and rebuilding of Chicago Harbor Light Station, Ill., and establishing lights on the new breakwater in Chicago Harbor.	6, 400
Constructing light keepers' dwellings and appurtenant structures, including sites therefor, within the limit of cost fixed by the act approved February 26, 1907.	50, 000
Extending and enlarging the machine shop at the lighthouse depot, Tompkinsville, Staten Island, N. Y.	30, 000
Providing riprap to reinforce foundations of light stations and constructing or improving boat landings in the third lighthouse district.	150, 000
Establishing new aids to navigation and improving existing aids in Alaska. .	75, 000

Measures were taken to inaugurate work on all these projects and to push them to completion as promptly as possible.

The deficiency appropriation act now pending contains the following items for the Lighthouse Service:

Constructing or purchasing and equipping tenders and light vessels to replace those worn out in service.	\$760, 000
Diamond Shoal Light Vessel, N. C.	450, 000
Completing the light and fog-signal station at Conneaut, Ohio.	19, 600

The item of \$760,000 is of special importance, marking the beginning, and only the beginning, of the process of replacement of the many old and worn-out vessels in the Service, referred to in Appendix A of this report. The item of \$450,000 for Diamond Shoal is for the replacement of the light vessel sunk by a German submarine on August 6, 1918.

COAST AND GEODETIC SURVEY.

(Col. E. LESTER JONES, *Superintendent.*)**Important Publications.**

Two publications of special importance were issued during the fiscal year 1918.

One of these is the series of publications on the Lambert Conformal Conic Projection. The principle of the Lambert projection is in a measure graphically illustrated in the figure opposite.

Many methods of projection have been designed to solve the difficult problem of representing a spherical surface on a plane. As different projections have unquestionably merits as well as equally serious defects, any region to be mapped should be made the subject of special study and that system of projection adopted which will give the best results for the area and purposes under consideration.

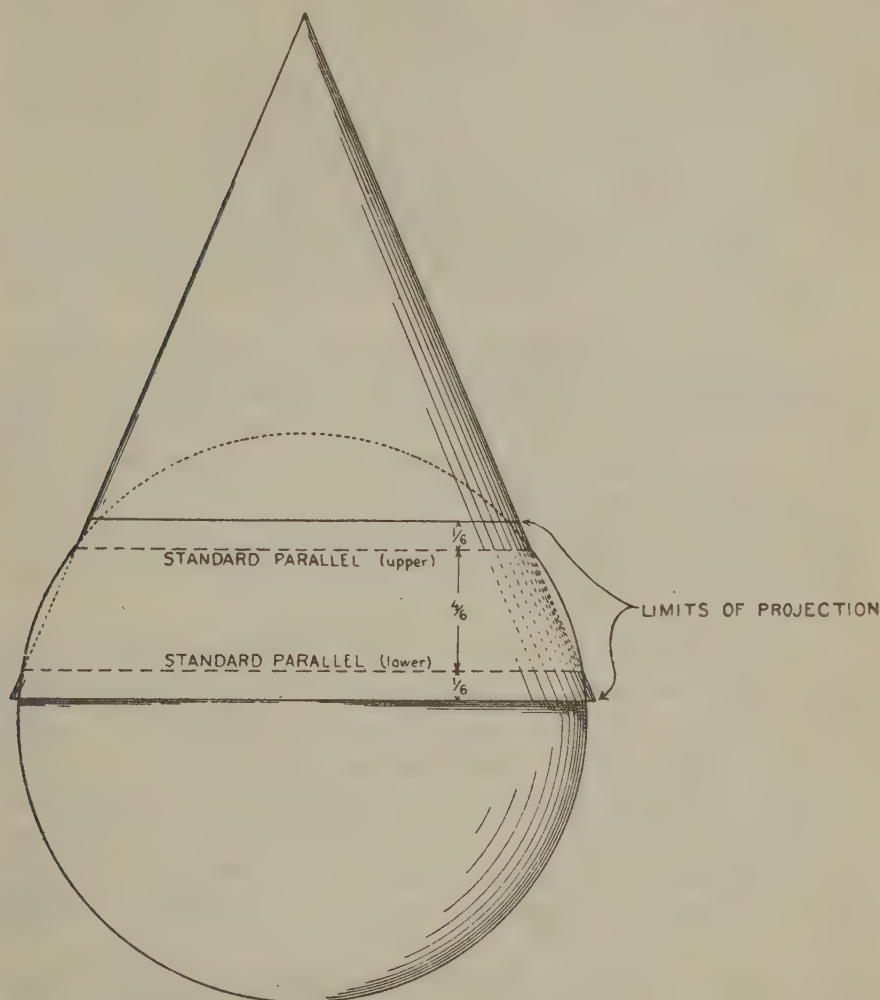
The Mercator projection, almost universally used for nautical charts, is responsible for many false impressions of the relative size of countries differing in latitude. The polyconic projection widely used and well adapted for most topographic and hydrographic surveys, when used for the whole of the United States in one map, has the serious defect of unduly exaggerating the areas on its eastern and western limits. Along the Pacific coast and in Maine the error in scale is as much as $6\frac{1}{2}$ per cent, while at New York it reaches $4\frac{1}{4}$ per cent.

The value of the new outline map on the new Lambert projection can best be realized when it is stated that throughout the larger and most important parts of the United States—that is, between latitudes $30\frac{1}{2}$ and 49° —the maximum scale error is only one-half of 1 per cent. This scale error of one-half of 1 per cent is frequently less than the distortion due to the method of printing and to changes from the humidity of the air. Only in southernmost Florida and Texas does this projection attain its maximum error of $2\frac{1}{3}$ per cent.

The Lambert projection is well adapted to large areas of predominating east-and-west dimensions, as the United States, where the distances across from east to west is one and four-fifths times that of the distance north and south.

The strength of the polyconic projection, on the other hand, is along its central meridian. The merits and defects of the two systems of projection may be stated in a general way as being at right angles with each other.

Special features of the Lambert projection that are not found in the polyconic may be stated briefly, as follows:



LAMBERT'S CONFORMAL CONIC PROJECTION

Diagram illustrating the intersection of a cone and sphere along the two standard parallels.

1. The Lambert projection is conformal; that is, all angles between intersecting lines or curves are preserved, and for any given point (or restricted locality) the ratio of the length of a linear element on the earth's surface to the length on the corresponding map element is constant for all azimuths or directions in which the element may be taken.
2. The meridians are straight lines and the parallels are concentric circles.

3. It has two axes of strength instead of one, the standard parallels of the map of the United States being latitudes 33° and 45° , and upon these parallels the scale is absolutely true. The scale for any other part of the map, or any parallel, can be obtained from tables contained in one of the series of these publications. By means of these tables, the very small scale errors in this projection can be entirely eliminated.

The other publication is the Report on the Connection of the Arcs of Primary Triangulation Along the Ninety-Eighth Meridian in the United States and in Mexico and on Triangulation in Southern Texas.

An event of the greatest importance in the history of geodesy was consummated in the spring of 1916, when observations were made at stations on the northern and southern banks of the Rio Grande, which connected the arcs of primary triangulation which had been established in the United States and in Mexico along the ninety-eighth meridian. The connection is interesting to the geodesist, because it makes available a very long meridional arc of connected and completed triangulation.

This connection will make available data from which to compute with greater accuracy than heretofore the dimensions of the earth. This will in itself make the work a notable contribution to science. But of even greater moment is the fact that the connection of the triangulation of the United States and Mexico will enable the latter country to extend to new areas from the ninety-eighth meridian arc geodetic control for surveys and maps in the form of triangulation which can be made on the North American datum.

This datum had been called the United States standard datum previous to the year 1913, when it was also adopted by Mexico and Canada for their geodetic coordinates. Its designation was changed to the North American datum when it had thus attained an international character.

Field Work.

This country was at war with Germany during the period this report covers, and the naval needs of the country required all available vessels. It was, therefore, very late in the fiscal year 1919 before any vessels could be released for civil duties. The five vessels of the Coast and Geodetic Survey that had been transferred to the Navy Department to meet its needs were retransferred to the Coast and Geodetic Survey April 1, 1919, by Executive

order. These vessels are the *Surveyor*, the *Bache*, the *Isis*, the *Explorer*, and the *Patterson* (temporarily renamed the *Forward*). Under authority of the act of Congress, section 8557, Compiled Statutes (R. S. 4686), the President is authorized to transfer such vessels, boats, and auxiliary ships or any of them which are not necessary to the needs of the Navy to any other executive department of the Government that has need for such vessels. Acting under this authority, the following vessels of the Navy Department were transferred to the service and jurisdiction of the Coast and Geodetic Survey: *Natoma*, April 9, 1919; *Wenonah*, April 12, 1919; *Onward*, April 19, 1919; *Ranger*, April 28, 1919; *Arcturus*, May 5, 1919.

The following table gives a condensed statement of the vessels at the disposal of the Coast and Geodetic Survey within the fiscal year:

Name of vessel.	Transferred to Coast and Geodetic Survey by Navy.	Loaned to Coast and Geodetic Survey by Philippine Government.	Owned by Coast and Geodetic Survey at beginning of fiscal year.	Sold during the fiscal year.
Arcturus.....	I			
Bache.....			I	
Cosmos.....			I	
Explorer.....			I	
Fathomer.....		I		
Hydrographer.....			I	
Isis.....			I	
Matchless.....			I	I
Natoma.....	I			
Onward.....	I			
Pathfinder.....			I	
Ranger.....	I			
Patterson.....			I	
Romblon.....		I		
Surveyor.....			I	
Wenonah.....	I			
Total.....	5	2	9	I

Transferred from Navy.....	5
Loaned by Philippine Government.....	2
Owned by Coast and Geodetic Survey.....	9
Total.....	16
Sold during the year.....	I

Total vessels at disposal of the Survey at end of fiscal year..... 15

The following statement is instructive as to the size of the vessels now operated by the bureau:

	Gross tonnage.		Gross tonnage.
Surveyor.....	1,000	Explorer.....	335
Pathfinder.....	690	Wenonah.....	240
Patterson.....	500	Ranger.....	219
Arcturus.....	456	Onward.....	157
Fathomer.....	431	Matchless.....	118
Romblon.....	411	Hydrographer.....	116
Isis.....	377	Natoma.....	112
Bache.....	370		

Summarized, the hydrographic accomplishments during the fiscal year are as follows:

	Square statute miles.
Ship hydrography.....	784.2
Launch hydrography.....	89.1
Wire-drag surveys.....	510.6
Revision surveys.....	82.0

Last year Congress authorized a nominal extra compensation to employees of the Bureau of Lighthouses stationed on lightships when they are engaged in making current observations for the Coast and Geodetic Survey. Under this arrangement observations were begun as soon as instruments could be procured and installed on the various lightships. Within the year such observations were made on 23 different lightships stationed on both the Atlantic and Pacific coasts.

Short series of current observations were made at 57 different stations on both the Atlantic and Pacific coasts.

Tidal observations were made throughout the year at 12 permanent tidal stations, 9 on the Atlantic and Gulf coasts, and 2 on the Pacific coast. Besides the tidal observations at the permanent stations, important observations were made at 44 different stations on both coasts of continental United States, and on the coasts of Alaska and the Philippine Islands. In connection with the hydrographic work, 96.7 square miles of topography were executed.

Primary triangulation was executed from the ninety-eighth meridian, in the vicinity of Waco, Tex., to Robeline, La. The length of this scheme is 255 miles, and an area of 3,570 square miles was covered. Secondary triangulation was run from Sanford, N. C., to the vicinity of Madison, N. C. The length of the scheme is 120 miles, and the area covered is 1,700 square miles. Secondary triangulation was also run from Turkey Point Light to Sandy Point Light, Chesapeake Bay. The length of this scheme is 37 miles, and the area covered is 210 square miles.

Tertiary triangulation was executed as follows: Morro Bay, Calif.: Length of scheme, 5 miles; area covered, 8 square miles. Key Biscayne in the vicinity of Miami, Fla.: Length of scheme, 15 miles; area covered, 42 square miles. Vicinity of Charleston S. C.: Length of scheme, 14 miles; area covered, 27 square miles.

A primary traverse was run from Vaughan, N. C., to Blaney, S. C. The length of the line is 235 miles. Another primary traverse was run from Wilmington to Sanford, N. C. The length of this line is 125 miles.

One arc of reconnoissance extends from the vicinity of Waco, Tex., eastward to Robeline, La. The length of this reconnoissance is 255 miles. Another reconnoissance, 50 miles in length, was run in the vicinity of Prescott, Ariz. A line of reconnoissance, also 50 miles in length, was run in the vicinity of Richfield, Utah.

There were 1,190 miles of precise leveling run during the fiscal year 1919. Magnetic observations were made during the year at 77 stations in 11 States, of which 34 were new primary stations, 17 auxiliary stations, 22 repeat stations for the determination of secular change, and 4 new stations in old localities. The regular observatories of the bureau at Cheltenham, Md.; Vieques, P. R.; Tucson, Ariz.; Sitka, Alaska; and near Honolulu, Hawaii, were in operation throughout the year.

Needs of the Survey to Better Accomplish its Field Work.

The end of the fiscal year finds the Survey with a fleet of 15 vessels, a truly considerable number when compared with those available in previous years and probably more than has ever been at the disposal of the bureau at any one time in its history. This comparatively large number of vessels is due to the fact that five vessels have been transferred to the bureau from the Navy Department under authority of the Executive order of May 24, 1919. These five were part of a number of vessels that the Navy Department had acquired to meet the temporary naval need for patrol boats, etc., during the war. Even with these additions from the Navy Department, however, the condition of the Survey's fleet is unsatisfactory. While there are numbers, there are inefficient units. When it was learned that the Navy had vessels that could be transferred, a board of Coast Survey officers was appointed to consult with the proper officials of the Navy Department to learn what vessels were available for transfer that were suited to the needs of the Survey. After a thorough examination of all the vessels that the Navy Department had available for

transfer, the board recommended that the five vessels above named be taken over. These vessels were accepted not because they are wholly suited for our work, but because they are the best means to an end at the present time. I feel that we have a great responsibility in meeting the marine needs of this country in finding and charting the dangers to navigation. The need is so pressing that we are confident that we are justified in doing what can be done with these vessels turned over by the Navy Department, though at an overhead cost considerably more than if vessels designed for the use of the Survey could be had.

The vessels we have thus acquired, after a careful investigation of those available, can not be efficiently operated as surveying vessels. Ship hydrography can not be economically carried on with a vessel that is too large, because too large a complement of officers and men is required, nor can the work be done with safety with a vessel that is too small, because she can not live through the severe weather that will be met. Furthermore, the character of the area to be surveyed seldom permits clean-cut classification, so that it can be determined before hand that this portion of it will be done by vessel and that by launches. Greater and more economical progress is made if the vessel is equipped to carry launches on her deck, and when the field of operation is reached the launch hydrography (in waters too shallow for the vessel to operate) is done in conjunction with the ship hydrography. Thus the entire area is covered by the same party during the same season.

There are two classes of ship hydrography: Offshore, such as that off the coasts of California, Oregon, and Washington, out to the 1,000-fathom curve. The other class is known as combined hydrography, such as that along the coast of Alaska, where there are many areas of which the deeper water hydrography must be done by a vessel and the waters inshore by launches.

The particular reasons why the yachts that we have obtained from the Navy Department are not suitable for either of these classes of hydrography are these: The offshore hydrography that must be done by ships along the coast of Washington, Oregon, and California out to the 1,000-fathom curve extends a general average distance of 30 miles from shore. Along these coasts the harbors of refuge are few and far between. Furthermore, the storms encountered within the area that must be surveyed are generally very severe. To buffet the storms that will surely be encountered a staunch sea-going vessel is required. The yachts now in our pos-

session have neither the strength required of hull nor machinery to stand the strain to which they would be subjected in these storms. Furthermore, if they were staunch enough for this outside work, they have not the fuel capacity to make it economical to operate them there. Too much time would have to be expended in running to the widely separated ports to obtain fuel supplies. This class of hydrography is done by running lines of soundings at right angles to the shore to and from the shore out to the 1,000-fathom curve. If a vessel only has fuel capacity to enable her to make but a few trips from the shore out to the 1,000-fathom curve and back to shore and then she must abandon her work and steam some hundreds of miles to a port to obtain a fresh supply of fuel, it is readily seen that there is an enormous loss of time, and consequently a great overhead cost to carry on this class of surveys with such a vessel. Vessels properly designed for this work are oil-burning and have a cruising radius of several thousand miles.

The other class, known as combined hydrography, covers areas where for the sake of economy the ship hydrography and the launch hydrography should be executed at the same time. The vessels that came to us from the Navy Département were yachts. They were built for speed and along narrow lines. They neither have the deck room for the storage of launches or for installation of hoisting apparatus for hoisting them aboard the vessel, nor the stability to carry the apparatus.

It seems to be the impression that there is no justification in our asking for appropriations for new vessels especially designed for the work of this bureau so long as there would be surplus vessels after the war; but such views are erroneous. A great public need would be more quickly met, and in the long run dollars that come from the Public Treasury would be saved if proper surveying vessels were provided for this bureau. It costs practically as much in personnel, food, fuel, and supplies to operate an inefficient vessel as it does to operate an efficient one. As it is, we will make what progress we can at a very considerable loss of efficiency in picking here and there sheltered waters where these vessels can be used, and equip the larger ones with as many launches as they will carry, probably not more than two, so that the vessel hydrography will progress more rapidly than the launch hydrography and delays will be enforced in regions where combined vessel and launch hydrography are necessary. There is as much necessity for vessels of special design for making surveys

as there is for use as tugs, ferries, lightships, and for freight or passenger vessels.

In 16 years, or from 1903 to 1919, but one effective appropriation was made for vessels for the Coast and Geodetic Survey, and that was for the fiscal year ended June 30, 1916, when the sum of \$289,000 was authorized for two new vessels, including their equipment. Through this appropriation we procured two vessels, one especially designed and built for a surveying vessel, and the other was purchased. For the fiscal year ended June 30, 1919, an appropriation was made in the following words: "For one new vessel, including equipment, to cost not exceeding \$354,000, \$50,000."

The question was submitted to the Comptroller of the Treasury whether there was authority to enter into a contract for the construction of a vessel to cost not exceeding the limit mentioned. The Comptroller held that the legislation did not in specific terms declare that a contract could be executed in excess of the amount appropriated, and therefore such a contract would be in violation of the act of June 30, 1906.

We have never had the vessels and personnel to bring the surveys of our waters up to a proper standard. The charts of Alaskan waters are incomplete, and the information shown on many of them is from exploration surveys by the Russians before Alaska was acquired by the United States and with a lack of exactness that would not be tolerated at the present time. The charts of the waters of the three Pacific Coast States do not contain sufficient information for offshore navigation and many of the charts of the Atlantic coast and Gulf coast of the United States are lacking in the same respect. And this should be borne in mind, that heretofore the vessels that plied our waters have been largely of foreign registration, and, therefore, losses on account of inadequate surveys have been borne to a considerable extent by other countries than ours, but that the war has brought about a great stimulation of shipbuilding in this country so that our vessels have increased from 26,397 with a gross tonnage of 8,871,037 on June 30, 1917, to 27,513 with a gross tonnage of 12,707,300 at the end of the fiscal year 1919. What is more significant still is that the increase of our merchant fleet has been not in small coasting craft, but ships of a size and type adapted to ocean service. While on July 30, 1914, just before the outbreak of the great war, our seagoing merchant ships of 1,000 gross

tons or over numbered only 755, of 2,128,731 gross tons, these vessels of more than 1,000 gross tons number on June 30, 1919, no fewer than 2,058, of 7,300,022 gross tons, or a net gain of more than 5,000,000 tons in vessels capable of ocean navigation.

In the sundry civil bill for the fiscal year ended June 30, 1919, the sum of \$62,500 was appropriated for wire-drag launches, including their equipment for the Coast and Geodetic Survey. Out of this appropriation four 60-foot launches have been built and equipped and three 30-foot tenders. One 30-foot tender was purchased.

While these launches have been in commission but a very short time, they have already demonstrated their efficiency in carrying on our wire-drag surveys. They are trim vessels, with sufficient strength to propel the wire drags and yet economical of fuel consumption. They are especially designed for this class of work, and therefore have the proper amount of space, and in right place, for storing all the necessary equipment and implements for making wire-drag surveys. They are far superior to the weaker, lumbering fishing vessels that have been hired heretofore for pulling the wire drag and which we have been forced to alter in order to install the wire-drag equipment, reels, engines, etc. With this demonstrated efficiency and economy that has resulted from the use of these vessels especially designed for this work, there is the stronger reason that such vessels should be utilized for carrying on all our wire-drag surveys. The wire-drag vessels that have been built for us out of the appropriation for 1919 are sufficient to operate two wire-drag parties. There are four regions where the wire-drag survey only is capable of finding the hidden, underwater dangers to navigation. These are all along the coast of New England, and Long Island Sound down to the entrance to New York Harbor. In this region are found the glacial deposits of boulders left beneath the waters bordering the coast. The second general region is the coast of Florida from Palm Beach southward around the southern shores and up to the neighborhood of Cedar Keys. In these waters the coral reefs are dangers to navigation. Some of these reefs are in the form of small islands, known locally as keys, while others are entirely submerged and are grave menaces to navigation. While coral reefs are characteristic of all these waters, the regions where wire-drag examinations are most urgently needed are in the vicinity of Key West and to the westward from there and then northward through the channels that

commercial vessels take in and out of the Gulf from Mobile, New Orleans, etc. The third region where wire-drag surveys are required is in the coral-infested waters of Porto Rico and the Virgin Islands. The fourth general region where wire-drag surveys are required is along the coast and through the passages of southeastern Alaska. The danger to be found here is the pinnacle rock, which is found in the form of a narrow needle-like rock that extends from a very great depth to very near the surface of the ocean. Ordinary soundings with the lead and line are of little avail in finding these pinnacle rocks and, indeed, are often quite deceptive in that such soundings show a very considerable depth and give assurance of safety, while danger may be at hand. Instances are known where the pinnacle rocks come to within a very short distance of the surface of the water, while soundings showed depths of hundreds of feet in their immediate neighborhood. There is one other small area where the wire drag should be used. This is at the Atlantic entrance to the Panama Canal. The total area in square statute miles of these four general regions yet to be covered by the wire drag is 54,319.

From this it follows that two wire-drag parties that can be operated with the modern wire-drag vessels that we now have can only accomplish a fractional part of the wire-drag work that remains to be done. In the belief that the remedy should be applied where the danger is greatest, one of these parties is operating in Long Island Sound and the other off the coast of Maine. Wire-drag work can be effectively carried on in these waters from about the 1st of April until the close of November.

We have acquired from the Navy two fairly large power launches. While these have not been built for wire-drag purposes, we believe that with some alteration they will fairly answer for this purpose. These will be used in Alaskan waters. The wire drag requires two power launches, one at each end of the drag. These launches are too large to be used both on the same drag. A very efficient drag would be formed by using one of these launches acquired from the Navy and one of the type of those that have been built for us out of the appropriations for 1919. Therefore what is needed is four additional 60-foot launches of the type of those built out of the appropriation for 1919. Two of these in conjunction with the two launches acquired from the Navy would make up two wire-drag parties for the Alaskan waters, and the other two would provide a wire-drag party for the coast of Florida.

There is more wire-drag work than can be completed by the five wire-drag parties that would be thus provided within the lifetime of the launches, a period of about 10 years. After that time the upkeep would be excessive.

Another need of the field service of the bureau is an investigation of the possibilities of the use of the aeroplane in making topographic surveys and hydrographic examinations, as well as revision surveys. Aeroplane photographs were used to a very great extent during the war in locating military features of the enemy. The same principle can be used in surveying and mapping, but a large amount of research work will have to be done before the aeroplane photograph will give the accuracy required of the highest grade of surveying done by the Coast and Geodetic Survey.

It is a very difficult matter to keep the topographic features up to date on the 700 charts of the United States Coast and Geodetic Survey with the old methods, but it is possible in many cases and especially in a flat country, to make very rapid revision of the shore line and adjacent land areas by means of photographs taken from aeroplanes.

The mapping of the country adjacent to the shores where there is considerable relief is at present not practicable from the aeroplane on account of the great amount of work that would be involved in reducing the photograph to the map. It is believed that methods will be developed by which this will be done more expeditiously, and then there will be no limit to the character of terrain on which the aeroplane can be used for surveying.

It must not be supposed that the aeroplane can entirely supersede the usual methods of surveying. We shall still need triangulation and traverse to give the fundamental control for the work, and much planetable work will have to be done to locate topographical features which may be used in the control of the position of the aeroplane photographs. It is also probable that the planetable will still be the method for placing the contours on the map. While it is possible to obtain some idea of the relief of the country from overlapping aeroplane photographs, at the same time the problem of placing contours accurately on the map is one which will be difficult to solve. The office expense of contouring a map from aeroplane photographs will undoubtedly be greater than by an instrumental party working in the field, if the contouring is to be of a high grade of accuracy. The most promising field for surveying and mapping from an aeroplane is

over flat country, or country with low reliefs, and in revision surveys where the contouring has already been accurately done. The changing features are shore lines, woods, roads, bridges, etc. These features can be readily placed on the old map by fitting in the new features shown on the photograph.

What seems to be most desirable at present is that we should have a research laboratory connected with the air service of the Army or the Navy in which various methods and instruments might be tested. Such a laboratory would preferably be in the vicinity of Washington, where the Government survey and mapping organizations are located.

War Work of the Coast and Geodetic Survey.

The Coast and Geodetic Survey bore an important burden during the war, both in the field and in the office. All told, 268 men drawn both from the field and the office took part in the war. These were drawn from all ranks of the employees of the bureau, ranging from the Superintendent to temporary men employed by the field parties.

The bureau contributed five of its survey vessels to the fleet operated by the Navy. One of those vessels, the *Surveyor*, was employed on convoy duty to and from Mediterranean ports. While on one of these trips the convoy was attacked by two German submarines, one of which was the famous *U-39* which sunk the *Lusitania*. The *U-39* fired a torpedo which grazed the bow of the *Surveyor* and was visible from the deck of that vessel. The wake of the submarine was picked up by the *Surveyor* and she was able to get in a position for favorable discharge of the depth charge. As the *Surveyor* was unable to leave the convoy, she was unable to return and finish the submarine, but did succeed in disabling it to the extent that the submarine was compelled to enter Cartagena, Spain, and intern there. Another vessel of the bureau, the *Isis*, was on duty at New York as flagship of the commandant of squadron 2, cruiser force, from November 16, 1917, to October 14, 1918, and was on duty at Yorktown and Hampton Roads as flagship of division 4, battleship force 1, from October 15, 1918, to April 1, 1919. A third vessel, the *Bache*, was assigned to squadron 5, fifth district, and performed general salvage work, outside patrol, and guardship duty off Virginia Capes. Her primary duty was identification and passing of all inbound and outbound vessels. She was the means of communication between naval authorities and these vessels. She handled mail, gave medical assistance to

passing vessels, and performed important salvage operations. Two other vessels of the bureau were assigned to patrol duty in Alaskan waters. They were the *Explorer* and the *Patterson* (re-named the *Forward*).

Besides this direct assistance to the military branches of the Government by the contribution of men and vessels, the Coast and Geodetic Survey rendered valuable service to both these branches through its field and office force. In the field, assistance consisted of furnishing certain control for maps in critical areas selected by the chief of military mapping of the Corps of Engineers of the Army. These areas were in Texas, Georgia, Florida, South Carolina, North Carolina, and Virginia. The work was chiefly triangulation, traverse, and leveling. Special hydrographic examinations were made by means of the wire drag at points designated by the Navy Department. Among such were the wire-drag surveys in Long Island Sound and in York River (Chesapeake Bay). An extensive wire-drag examination was made of the waters of the vicinity of Eastport, Me. Besides this, surveys were made for the location of points for naval fire-control experiments, the reestablishment of the speed trial course at Lewes, Del., for torpedo-boat destroyers, the location of the Port Jefferson trial course in Long Island Sound, and the Block Island (R. I.) trial course.

STEAMBOAT-INSPECTION SERVICE.

(GEORGE UHLER, *Supervising Inspector General*.)

Organization.

There were the following positions in the Steamboat-Inspection Service at the close of business on June 30, 1919:

At Washington, D. C. (central office force):

Supervising Inspector General.....	1
Deputy Supervising Inspector General (who is Acting Supervising Inspector General in the absence of that officer).....	1
Clerks.....	10
Messenger.....	1
	13

In the Service at large (field force):

Supervising inspectors.....	11
Traveling inspectors.....	3
Local inspectors of hulls.....	48
Local inspectors of boilers.....	48
Assistant inspectors of hulls.....	82
Assistant inspectors of boilers.....	83
Clerks to boards of local inspectors.....	97
	372

Total..... 385

Attention is specially directed to the small size of the central office force.

Sixty-four permanent positions were added to the Service during the year, as follows:

One supervising inspector at Seattle, Wash., and one traveling inspector with headquarters in the office of the Supervising Inspector General.

One clerk in the office of the Supervising Inspector General, Washington, D. C.

The following assistant inspectors: Two assistant inspectors of hulls and three assistant inspectors of boilers, San Francisco, Calif. Two assistant inspectors of hulls and two assistant inspectors of boilers, Cleveland, Ohio. One assistant inspector of hulls and two assistant inspectors of boilers, Philadelphia, Pa.; Seattle, Wash.; and Portland, Oreg. Two assistant inspectors of hulls and one assistant inspector of boilers, New York, N. Y. One assistant inspector of hulls and one assistant inspector of boilers, Boston, Mass.; Milwaukee, Wis.; Los Angeles, Calif.; New London, Conn.; and Portland, Me. One assistant inspector of hulls, Baltimore, Md.; New Haven, Conn.; and Norfolk, Va. And one assistant inspector of boilers, Chicago, Ill.; Jacksonville, Fla.; and Toledo, Ohio.

Twenty-four additional clerks were added in the Service at large.

Summary of Activities and Statistics.

Following is a summary of activities and statistics for the fiscal year 1919:

The force inspected and certificated 7,407 vessels, with a total gross tonnage of 11,562,166, of which 7,134 were domestic vessels, with a total gross tonnage of 9,128,911, and 273 were foreign passenger steam vessels, with a total gross tonnage of 2,433,255. Of the domestic vessels there were 5,880 steam vessels, 709 motor vessels, 17 passenger barges, and 528 seagoing barges. There was an increase of 392 in the total number of vessels inspected and an increase of 3,097,470 in the total gross tonnage of vessels inspected, as compared with the previous fiscal year. Letters of approval of designs of boilers, engines, and other operating machinery were granted to 23 steam vessels, with a total gross tonnage of 672. There were inspected for the United States Government 79 hulls and 2,337 boilers. There were 2,053 reinspections of passenger and ferry steamers.

Licenses were issued to 28,069 officers of all grades. There were examined for visual defects 9,753 applicants for license, of whom 108 were found color blind or with other visual defects and rejected. Certificates of service were issued to 8,796 able seamen, and 760 were rejected. Certificates of efficiency were issued to 3,910 lifeboat men, and 344 were rejected.

Steel plates for the construction of marine boilers to the number of 35,427 were inspected at the mills, and a large amount of other boiler material was inspected. There were examined and tested 435,337 new life preservers, of which number 8,311 were rejected.

The total number of accidents resulting in loss of life was 194. The total number of lives lost was 543, of which 202 were passengers. Of the lives lost, 170 were from suicide, accidental drowning, and other causes beyond the power of the Service to prevent, leaving a loss of 373 as fairly chargeable to accidents, collisions, foundering, etc. There was an increase of 43 in the number of lives lost, as compared with the previous fiscal year. Passengers to the number of 323,317,657 were carried on vessels required by law to make report of the number of passengers carried. Dividing this number by 202, the total number of passengers lost, shows that 1,600,582 passengers were carried for each passenger lost. The number of lives directly saved by means of the life-saving appliances required by law was 2,349.

Reconstruction.

One of the great problems to which the Nation must give its attention is that of transportation, and, so far as transportation by water is concerned, the Steamboat-Inspection Service must necessarily have an important part, because vessels of the American merchant marine are subject to the inspection of that Service. Therefore, if there can be any improvements made in the methods of administration, those improvements should be made now, so that the American merchant marine may not only be placed in the first rank of all the nations but that it may remain there. There will be briefly discussed the proposition of an improvement to be made in the approval of hull and boiler construction, the question of the licensing of men, and changes that should be made in the law with reference to boiler pressures.

Centralization of Approval of Hull and Boiler Construction.

It is important at this time to improve the methods of the approval of hull construction. This could be accomplished by

creating in the office of the Supervising Inspector General a corps of experts, whose business it would be to examine and pass upon blue prints and specifications submitted by persons purposing to build ships. When approved, the blue prints would be referred to the respective boards of local inspectors in whose district the vessel or vessels were to be built. The inspectors' duty would be to see that they were built in accordance with the blue prints. The result of this procedure would be to standardize in a large measure hull construction and hull inspection.

Although the regulation adopted by the Board of Supervising Inspectors in regard to the stability of vessels provides that when inspectors have any reason to question the stability of any vessel under their jurisdiction they shall require the owners of the vessel to make inclining tests on such vessel under the supervision of expert naval architects provided by this Department, the Service does not discover the condition until after the vessel is navigated and until after the risk has been assumed by those who travel upon the ship. It is proposed, therefore, to have enacted by the Board of Supervising Inspectors, without delay, a rule that will require a stability test of all vessels that are built, the tests to be conducted under the direction of naval architects provided by this Department. While this is a narrower proposition than that of the creation of a board of naval architects working under the direction of the Supervising Inspector General, it is one that will meet and possibly control the situation until proper action can be taken to provide for the corps of naval architects.

It is also quite as necessary that boiler construction should be approved in the office of the Supervising Inspector General by a corps of expert engineers in the same manner as hull construction.

It will be clear that, in order to have that uniform administration of the law with reference to the approval of hull and boiler construction, with which the Supervising Inspector General is charged, there must be centralized authority.

Examination of Applicants for Licenses.

It has been suggested to the Steamboat-Inspection Service that, if uniform methods were used in examining applicants, a better class of licensed officers would be obtained, and that the procedure of the Civil Service Commission should be followed, so fixing one general practice in this respect. On the other hand, it may be stated that the United States covers a vast expanse of territory, representing many varied local conditions, and it is felt

that, in the matter of examining applicants, the local inspectors are better informed than any central authority could ever be. Furthermore, there would be considerable congestion in connection with obtaining licensed officers for the ships. These men do not come for examination once or twice a month, but usually every day, and the local inspectors adjust their business so as to examine them when they appear. As a result, the Service has been able under war conditions to obtain licensed officers for the rapidly increasing number of ships.

Boiler Pressure.

The rules of the Steamboat-Inspection Service are not up to date with reference to boiler pressures, proper credit is not given for the riveting plan above double riveting, and improvements can be made with reference to hydrostatic pressure. The Service, therefore, caused to be drafted a bill looking to the amendment of sections 4433 and 4418, Revised Statutes. That bill is Senate bill 574.

The purposes of the proposed amendments in section 4433, Revised Statutes, are, first, to do away with the obsolete rule contained in the law, prescribing a working steam pressure for single-riveted joints, without taking into consideration the percentage strength of the riveted joint, and allowing 20 per cent additional pressure for double-riveted joints, but not allowing a greater working pressure for triple-riveted and quadruple-riveted, etc., lap and butt joints. For these, greater working pressure should be allowed on account of the greater strength of the triple-riveted and other similar joints.

This greater allowable working pressure for the stronger forms of riveted joints has for years been desired by boiler users.

The present law furnishes no incentive for building boilers with stronger kinds of joints than double-riveted joints that will carry a greater working pressure with but slight increase in the amount of material required for boiler shell.

Further, by placing the authority to prescribe rules for working pressure on boilers with the Board of Supervising Inspectors, with the approval of the Secretary of Commerce, that board will prescribe rules that will meet the various conditions of boiler construction, taking into consideration the percentage strength of the various kinds of riveted joints.

Rules for calking would be prescribed by the Board of Supervising Inspectors in connection with rules for riveted joints.

The purpose of the amendments in section 4418, Revised Statutes, is in order to leave with the Board of Supervising Inspectors the authority of determining the hydrostatic test in connection with the rules for riveting that would be adopted by the board and approved by the Secretary of Commerce.

The proposition of giving the Board of Supervising Inspectors the authority to make modern its rules with reference to boiler pressures is consistent with the whole theory of reconstruction. It is absolutely necessary that it be adopted, in order that the rehabilitation of the American merchant marine may go forward without delay.

BUREAU OF NAVIGATION.

(EUGENE TYLER CHAMBERLAIN, *Commissioner*.)

American shipping registered for the foreign trade and enrolled and licensed for the coasting trade, including the fisheries, on June 30, 1919, comprised 27,513 vessels of 12,907,300 gross tons, compared with 26,711 vessels of 9,924,518 gross tons on June 30, 1918, an increase of 802 vessels and 2,982,782 gross tons. The following statement shows the total of our tonnage at the close of each of the past six fiscal years and indicates the great changes which have taken place within that period:

June 30—	Foreign trade.	Coasting trade.		Total.
		Great Lakes.	Sea and rivers.	
1914	1,076,152	2,882,922	3,969,614	7,928,688
1915	1,871,543	2,818,000	3,699,886	8,389,429
1916	2,191,715	2,760,815	3,517,119	8,469,649
1917	2,446,399	2,769,824	3,654,814	8,871,037
1918	3,603,706	2,708,523	3,612,289	9,924,518
1919	6,669,726	2,635,680	3,601,894	12,907,300

These figures show for the dates named the gross tonnage of ships registered, enrolled, or licensed; but they must not be taken unqualifiedly as the evidence of commercial growth. Of the total tonnage 3,827,201 gross tons were vessels over 1,000 tons owned by the Shipping Board and represent appropriations by Congress and the sacrifices made by the American people to win the war. The figure just stated does not fully represent the extent of the Government's ownership in ocean carrying, for on June 30, 1919, the War and Navy Departments were operating mainly as troop transports 405,021 gross tons of ships, including

most of the former German merchant ships seized in American harbors. These ships are not under register or enrollment on account of their temporary employment, but in any adequate statement of our maritime resources should be added to the 3,827,201 gross tons of Shipping Board ships.

Since 1914, as during the Napoleonic wars, American ships have appeared in large numbers in ports all over the world. Of the total increase in our shipping since June 30, 1914, almost 5,000,000 gross tons, nearly all has consisted of ocean-going steel steamers of 1,000 gross tons or over, of which on June 30, 1914, we had 429 of 1,589,733 gross tons and on June 30, 1919, 1,436 of 6,072,901 gross tons. Though effected by war causes, this growth is in the direction of normal mercantile-marine development. The increase, on the other hand, in wooden seagoing steamers of over 1,000 gross tons from 8 of 10,595 gross tons on June 30, 1914, to 293 of 693,541 gross tons on June 30, 1919, is to be counted in large measure as among our sacrificial efforts to win the war.

The vessels built in the United States and documented as vessels of the United States during the fiscal year numbered 1,953 of 3,326,621 gross tons, compared with 1,528 of 1,300,868 gross tons during the previous fiscal year. The standard by which the output of the United States should be measured is that of the rest of the world during prewar years. During the calendar year 1913, the year of the greatest prewar output, Lloyd's returns show a total of 1,932,153 gross tons launched in the United Kingdom, her greatest output, and 1,124,276 gross tons launched by the rest of the world, excluding the United States, a grand total of 3,056,429 gross tons. During that year the United States launched 276,448 gross tons. In a word, the people of the United States, mainly through war loans and war taxes, have expanded the shipbuilding industry until in tonnage output it has equaled the world's former annual commercial output of shipping. It is quite evident that this great industry can be maintained only if it is in a position to meet not merely the requirements for new tonnage of American shipowners, but also the requirements of shipowners of other nations less favorably placed by natural causes and legislative support than are we for shipbuilding.

World's Tonnage.

The world's merchant tonnage is larger now than at any other time in history. Lloyd's Register for 1914 stated the world's

total tonnage (vessels over 100 gross tons) at 49,089,000 gross tons, and the same authority for 1919 gives the world's total as 50,919,000.

A comparison of the volume of tonnage will be seriously misleading unless the quality of the tonnage also is considered when estimating the work it can now perform. About two-thirds of the tonnage now afloat was built before the war and has undergone not merely five years of ordinary wear and tear, but, in addition, the strain of constant service, with limited repairs hastily made. Furthermore, submarine warfare was directed against the best types of passenger ships, and the loss of ocean liners was especially heavy. This has been partly, not wholly, made good by the transfer of the former German passenger fleet to the flags of the maritime powers. The repair and restoration to a fair measure of usefulness of the ships built before the war has been undertaken, but it has involved temporary withdrawal of considerable tonnage.

The ships built during the war, taken as a whole, are inferior to the ships built before the war. This statement involves no reflection upon shipbuilders and shipowners. Indeed, they have had much less authority than usual over the plans or methods of ship construction, Government here and abroad having assumed virtually entire control over the building and operation of ships. The aim of Government generally has been to turn out the greatest volume of tonnage in the shortest possible time. The average speed of ships built during the war was below the average of pre-war construction. Very few passenger ships were built, and the urgent need for engines involved the building of cargo boats slower on the average than those building in 1914. The average size of ships was also smaller, because many of the yards formerly engaged in building larger ships were employed during the war on naval construction, and many of the new yards hastily established could turn out only smaller ones. Finally, hurried workmanship by labor in process of training can not be expected to produce the best results. The new oil-burning ships have, however, plain advantages in many trades over coal-burning ships.

These factors in the situation, though not easy to reduce to mathematical form, must be weighed in drawing conclusions from a comparison of the world's total tonnage now and before the war.

A true guide for present purposes would be a statement of the tonnage clearances of shipping in the world's foreign trade by sea, but such a statement is not now available.

The total clearances with cargo, however, from the ports of the United Kingdom for ports in foreign countries (excluding Germany) and British possessions during the seven months ended July 31, 1919, were 19,286,256 net tons, compared with 13,114,208 net tons for the corresponding period in 1918 and 36,261,475 net tons for the corresponding period in 1914. The tonnage clearances from the United States for Europe, Asia, Australia, Africa, and South America for several fiscal years are at hand, stated in net tons (each of 100 cubic feet of closed-in ship space). The following table shows the shipping actually available and employed for cargo and passengers clearing in overseas trade from the United States during the fiscal year ended June 30, 1914, the year of our greatest clearances before the war, during the year ended June 30, 1918, and the year ended June 30, 1919:

For—	1914	1918	1919
Europe.....	16,144,118	14,263,547	16,431,123
South America.....	2,429,659	2,237,976	2,705,365
Asia and Oceania.....	1,990,105	2,095,324	2,529,998
Africa.....	406,457	235,649	393,971
Total.....	20,970,339	18,832,496	22,060,457

From the clearances for Europe are excluded those for Germany, of which in 1918 there were none and in 1919 only 9,734 net tons, but 3,902,073 net tons in 1914. The figures for 1918 and 1919, however, do not include the shipping employed in transporting troops and our munitions of war, which greatly exceeded the tonnage clearances in previous times for Germany.

In ordinary times, on account of the greater bulk of our exports, ships usually clear from the United States with ample cargoes, while many enter in ballast or with part cargoes. In 1914, for example, 15 per cent of the shipping from Europe entered the United States in ballast, and at the present time the proportion is much greater, though the precise figures are not at hand. To a greater extent than usual, accordingly, foreign consumers must pay high freights on their imports from the United States, for those freights must often cover the charges of the voyage in ballast to America. Evidently such conditions can not long continue.

So far as the production of shipping to meet the situation is concerned, good progress is shown by Lloyd's report that on June

30, 1919, the merchant ships under construction in the world's yards aggregated 8,017,767 gross tons, of which 3,874,143 gross tons were building in the United States and 2,524,050 in the United Kingdom. The largest tonnage building under prewar returns was 3,445,000 gross tons reported by Lloyd's for June 30, 1913.

The growing share of American shipping in the overseas trade of the United States is shown by the following statement of the net tonnage of clearances of American ships for overseas during the fiscal years ended June 30, 1914, 1918, and 1919:

For—	1914	1918	1919
Europe.....	439,261	1,671,081	2,535,265
South America.....	192,479	823,354	1,290,248
Asia and Oceania.....	100,833	287,386	494,548
Africa.....	4,263	49,460	99,034
Total.....	736,836	2,831,281	4,419,095

As in the preceding statement of total net-tonnage clearances (which included American), these figures do not include Germany, to which in 1914 the American clearances amounted to 8,406 net tons, none in 1918, and 9,734 net tons in 1919.

The net tonnage of many merchant ships converted into Army transports are not included in the figures above.

Main Maritime Facts.

The main facts in the general maritime situation at this time are asfollows:

1. The world's merchant tonnage is the largest in history, but its average efficiency is below that of 1914 for inherent reasons in construction and for extraneous reasons such as port congestions, labor troubles, and management. The world's net gain in steam tonnage is 2,500,000 gross tons, the gain of the United States 7,600,000 gross tons, the loss of the rest of the world 5,100,000 gross tons.

2. The merchant tonnage now under construction is more than double the prewar output and is of increasing efficiency in the main.

3. The volume of the world's ocean-borne commerce is less than in normal times and will continue less until industrial and agricultural Europe has more fully recovered from the effects of the war.

The proportion exports to Europe bear to the world's total sea-borne commerce is above the average, involving high ocean-freight rates.

Our maritime situation, mainly as the result of expenditures authorized by Congress equal to the book value of the whole world's merchant fleets in 1914, is as follows:

1. Our seagoing steel steam tonnage (ships of over 1,000 gross tons) on June 30, 1919, was over 6,000,000 gross tons, four times greater than in 1914, and is increasing at the rate of over 350,000 gross tons a month, equaling our best annual outputs before the war.

2. The annual output of our shipyards exceeds the greatest annual output of the world's shipyards before 1914.

3. Steel-ship building plants have been extended or established with new machinery, methods, housing, and transit accommodations equal, and in some respects superior, to those abroad.

4. American tonnage clearing in overseas trade in the fiscal year 1919 was six times greater than in 1914.

Maritime Problem.

The maritime problem now before the United States is more difficult than in former years, because we have created with public funds a vast war plant of ships and shipyards which must be readjusted to the requirements of commerce.

Few will contend that shipbuilding and ship operation can be successfully maintained and developed in this country if Government is to furnish the funds and almost exclusively control both, as for the past two years. The question of raising the money by loans and taxes for the purpose is not for the moment in mind, though evidently there is a limit to that not far off in time. The building and operation of ships are two forms of industrial activity which least of all admit of monopoly or combination. The ocean is free to those who wish to navigate it. The most ingenious legislative devices, even in war times, have not restricted the individual of any country, except an enemy, from purchasing ships where he chooses and operating them. Limitations may be prescribed and obstacles erected, but these confirm the essentially competitive nature of shipbuilding and shipowning. These occupations accordingly offer some of the best fields for individual skill, application, enterprise, and foresight and the least advantageous fields for a system of Government ownership and management in which the qualities named are more likely to be stunted than developed.

It seems clear, therefore, that the restoration of our maritime affairs to individual control and operation is desirable for the healthy development of our national life. The sooner this action is taken the better for the future of the industries, because the next two years bid fair to be the crucial years in commercial maritime development. By that time it is reasonably safe to presume that the world's ocean-borne trade will be conducted on terms of the closest and, it may be hoped, the fairest competition.

American shipyards, accordingly, should be allowed to build freely for all comers, and in the long run they will gain by the withdrawal on equitable terms of Government contracts and the substitution therefor of private contracts. We already have steel-ship building plants nearly all of which are equal to and many superior to the older plants of other countries. The past two years have developed hundreds of thousands of shipbuilders who numbered only tens of thousands before the war. The supremacy of our steel industry is unchallenged. The same general principles should be considered in relation to the fleet afloat, the ships in operation or launched. Every interest suggests that these ships be disposed of to men trained to the most effective and economical operation of ships. The industrial and commercial situation of the world is too uncertain to warrant experiments in the operation of ships which might be inviting in times of general prosperity.

There will doubtless be opportunity, and probably necessity, for some lines operated either partially or indirectly by the Government in which to provide an outlet for our commerce to points that can not be profitably reached by private enterprise until commerce with them shall have been developed. Our ocean fleet is the servant of our trade, and where that trade can not be served effectively by private enterprise the Nation, through the Government, must do its part in opening the way in which our commerce is to flow. There is room, therefore, in the ocean trade for full and free opportunity for private enterprise and for the helping hand of the Government to meet special conditions in order that our commerce and industries shall by both be adequately served.

Subdivision of Hulls.

The recommendations of the International Conference on Safety of Life at Sea, in so far as they relate to the subdivision of hulls and other structural details of ocean passenger ships, have been held in abeyance during the war, although British trans-Atlantic passenger ships have been built during the period in

voluntary compliance with those recommendations. Although during the war we confined our efforts to building cargo ships, we must now include ocean passenger ships, and the recommendations of the conference and experience gained from the past five years should be considered in making plans for such ships. The subject called for prompt action, and I have accordingly requested the American members of the construction committee at the international conference to recommend a course of action and the administrative machinery required. These gentlemen—Rear Admiral W. L. Capps, U. S. Navy; Mr. Homer L. Ferguson, president of the Newport News Shipbuilding & Dry Dock Co. and of the Chamber of Commerce of the United States; and Mr. Alfred Gilbert Smith, president of the New York & Cuba Mail S. S. Co.—are of acknowledged standing and authority. It will undoubtedly be desirable to provide for a small technical staff to be permanently attached to the Department of Commerce to consider questions of the construction of passenger ships, whether the conference regulations or modifications of them be adopted.

Shipping Commissioners.

During the year 485,796 officers and men have been shipped and discharged, included repeated shipments and discharges, by United States shipping commissioners, compared with 457,248 for 1918 and 506,941 during 1917. Collectors of customs acting as shipping commissioners at ports where those officers are not established shipped and discharged last year 37,978 men, compared with 35,131 for the previous fiscal year and 18,439 for the fiscal year 1917. The great increase in American shipping in foreign trade is not reflected in these figures, because during the war our ships were manned to a great extent by men in the Navy. These naval crews are being discharged and merchant crews provided, as contemplated by law, for merchant ships. The work of shipping commissioners is increasing, especially at the principal seaports, and it has been necessary to submit deficiency estimates to cover this increase. ♦

Navigation Receipts.

The receipts from tonnage duties during the fiscal year amounted to \$1,265,229.23 (including \$2,041.98 Philippine Islands fund and \$5,028.50 alien and penal tonnage duties and light money). The total is \$93,810.87 greater than for the previous fiscal year. The largest annual receipts from tonnage duties were \$1,454,565.83 for the year ended June 30, 1916, and during the current fiscal

year receipts from this source should become normal and approach that amount.

Receipts from navigation fees amounted to \$143,492.19, compared with \$146,508.02 for the previous year. The receipts from navigation fines and penalties amounted to \$162,146.50, compared with \$32,097.68 for the previous year. The increase is almost wholly due to the forfeiture of the steamer *Sacramento*. This ship was a former German ship which by fraud secured an American register at San Francisco and forthwith under German direction proceeded with supplies to the squadron of Admiral von Spee, off the Juan Fernandez Islands, thus enabling that squadron to sail to its destruction off the Falklands. The steamer *Sacramento* was decreed forfeited and the forfeiture compromised for \$250,000, of which \$125,000 was paid last year, and the balance is to be paid during the current fiscal year.

The total navigation receipts for the year thus have been \$1,570,867.92, compared with \$1,351,492.66 for the previous fiscal year. It may be noted that the appropriations by Congress for all branches of the Navigation Bureau amounted to \$217,045.

Radio Communication.

Under the Executive order of April 30, 1917, "to insure the proper conduct of the war against the Imperial German Government and the successful termination thereof" coast radio stations were operated by the Navy Department or closed, and the order is still in force, pending ratification of the treaty of peace. The Navy Department continued the supervision of the allotment of radio apparatus to ship and shore stations and supplied naval radio operators to many ships. The regular force of radio inspectors of the Bureau of Navigation continued to serve with our armed forces ashore and afloat, and I am pleased to add that the value of their services in many instances has been recognized by our Government and the Governments of the allies by promotion and by the award of decorations. Many of our force have now been honorably discharged from the Army or Navy and with a few exceptions have returned to the bureau.

During the past year the bureau's Radio Service made 4,243 inspections on ships subject to the radio ship act, compared with 4,341 similar inspections during the previous fiscal year and, in addition, 917 inspections of the apparatus on ships voluntarily equipped. The inspections developed 425 cases of apparatus more or less defective or of inadequate complement of radio operators.

The inspection of ship apparatus was of the first importance for security, particularly during hostilities. It was not possible with the force available to make the critical examination of apparatus preliminary to the issue of licenses to ship stations under the act to regulate radio communication and the treaty to which it gives effect. Only 250 ship stations were thus fully examined, but, in addition, provisional licenses were issued to 1,196 ship stations. In some instances the apparatus for these stations was furnished by the Navy Department and was at times necessarily incomplete or imperfect. In addition, 866 ships are equipped with wireless apparatus, requiring licenses which it has not been practicable to issue even provisionally.

This branch of the work is very much in arrears, and the laws can be carried out only by a considerable increase in the inspection force for which a deficiency estimate has been submitted to Congress. On July 1, 1915, only 897 American ships were equipped with apparatus for radio communication, while on July 1, 1919, the number was 2,312. Meanwhile the appropriation for the maintenance of the wireless-inspection service in all its branches has remained \$45,000. With the coming of peace it will be necessary not only to overcome the arrears, but to provide for regularly continuing inspection, which soon will involve three times the number of American ships subject thereto in 1915.

The total number of examinations of applicants for radio operator's license was 2,729. One thousand one hundred and twenty-four passed the examinations and received operator's licenses. In addition, the licenses of 579 operators were renewed. After years of effort, the Bureau of Navigation has secured for its license to radio operators a reputation in the technical world so that the license is sought for as an evidence of proficiency by foreign operators, as well as by our own. The bureau decided not to lower the standard of its examination and license, but to meet emergencies due to the shortage of radio operators by authorizing inspectors to allow operators with some experience, but unable to pass the examination, to go to sea under a temporary permit. At the end of the fiscal year June 30, 1919, there were outstanding 48 commercial extra first-operators' licenses, 2,436 commercial first licenses, and 610 commercial second licenses, in all 3,094 operators, a number insufficient even if all were fully employed all the time to fully man the 2,312 American ships equipped with radio apparatus on June 30, 1919. The deficiency, however, is

being partly overcome by the radio inspectors, who are instructed to give special attention to the examination of operators.

The examination and license of amateur operators and stations ceased in April, 1917. The amateur field has recently again been opened.

The volume of radio inspection will thus be very much greater than it was before the war; furthermore, the commercial radio equipment of the near future will differ in many respects from that of the past because of the improvements, developments, and inventions resulting from the intensified use of radio communication during the war. More flexible and efficient equipment will come into use, including the radio telephone. The invention and improvement of directional radio apparatus by which position may be determined, to a great extent the result of investigations by an expert in the Bureau of Standards, this Department, have a special and obvious value at sea. Improvements in the tuning of apparatus permit a greatly increased amount of traffic. Radio telegraphy in certain localities where the maintenance of wire lines is impossible for physical reasons or prohibited on account of cost must hereafter be reckoned with. The wonderful advances in aerial navigation with the use of wireless for communication between ships in the air and stations on the earth introduces another complication.

The subject of the scientific development of radio communication during the war is too technical and complicated to be set forth in detail in this report. It is mentioned as showing that operators hereafter must have a broader theoretical training and a more accurate knowledge of the radio art than hitherto, the standards of the inspection service and the scientific qualifications of the inspectors must be advanced. These considerations have led the Department to ask for a deficiency appropriation of \$55,000 to meet conditions and requirements when radio communication resumes its normal place as an instrument of commercial communication.

International Radiotelegraphic Conference.

The developments in radio communication and the great improvement in transoceanic radio communication point to the need of a revision of the International Radiotelegraphic Convention of 1912, to which the United States is signatory. The International Radiotelegraphic Conference adjourned at London with the understanding that the next conference should be held

in 1917. The war made that impossible, but all are agreed that the conference should be held as early as possible in 1920, and Congress will be asked to provide for American representation.

Load Line, Measurement, Bulkheads.

The necessity for legislation to provide for load lines on cargo vessels has been referred to in my former reports. A bill (S. 575; H. R. 3621) embodying the views of this Department has been favorably reported to the Senate and the House of Representatives. The bill enables the Secretary of Commerce to avail himself of the facilities afforded by the American Bureau of Shipping and gives that useful organization an official status, establishing relations between our Government and the American bureau similar to those between the British Government and Lloyd's Society. To give effect to the legislation, several high-grade technical experts will be needed in the Department of Commerce, and at some ports it will be necessary to provide officers competent to make the surveys preliminary to the establishment of load lines in the case of ships which are not classed by the American bureau or by other classification societies. The estimates to give effect to the load-line bill, if enacted, are being prepared.

In my report for 1917 mention was made of the need for creating in seaboard and Great Lakes shipbuilding districts a small corps of men trained to the accurate measurement of ship tonnage instead of relying upon the detail of customs inspectors. This matter has not been pressed during the war. Hundreds of ships have been built in this period from a few sets of plans supplied by the Government simplifying the work of measurement. When one ship of a certain type had been carefully measured, it was necessary merely to send blue prints and results for their guidance to customs officers in districts where other ships of the same type and dimensions were under construction. In normal times many ships are built with regard to the particular trades in which they are to engage. This is the only way in which the fullest use can be secured from them and is necessary to success in the highly competitive business of shipping in foreign trade. In time we shall return to normal conditions. The Department of Commerce will then require a force of measurers of ships. Legislation and the estimates to give it effect await surer signs of the return to normal conditions in shipbuilding than are now in sight.

With the return of normal conditions it will be necessary also to give closer attention to bulkheads and other important details of construction.

Here, too, any intelligent action by the Government will require a small technical staff in the Department of Commerce and officers at certain seaports capable of giving effect understandingly to its recommendations and conclusions.

The three subjects load line, measurement, and bulkheads involve considerations of the safety of the ship and those on board which are paramount. They involve also issues of commercial competition on equal and fair terms. For both reasons it is plainly desirable that there should be substantial accord between the maritime powers in their legislation and administrative measures. Again, conditions at present are too remote from normal to warrant the suggestion of early and formal meetings of the maritime representatives of those powers to consider measures to effect such accord. It is not, however, too early to begin those informal conversations which necessarily must go before more formal action, and the Bureau of Navigation has the general subject under consideration.

Enforcement of Navigation Laws.

During the year 1919 the various services of the Bureau of Navigation reported 8,172 violations of the Navigation Laws, the largest number acted upon by this Department since its creation. These violations resulted in the collection of \$162,146.50 as fines, the largest amount collected from this source at least during the last 25 years, due mainly to the collection of a single penalty of \$125,000 in the case before described.

The work of enforcing the law was performed through the offices of the collectors of customs, navigation inspectors, Steamboat-Inspection Service, and the Department's inspection boats. In addition to these, 56 owners of motor boats, most of them members of the United States power squadron, tendered their services and boats on Sundays and holidays at \$1 per year.

During 1919 there were 11,071 counts of passengers going on excursion steamers aggregating 7,783,791 passengers, as compared with 4,916,772 passengers for the previous year. Of this number the navigation inspectors made 7,380 counts of 6,250,948 passengers.

On 408 occasions it was found necessary to prevent more passengers going on board vessels. This involved the safety of 186,307 passengers. The navigation inspectors are employed only during the months of June, July, and August. While not counting passengers they are employed in the general enforcement of the navigation laws, especially those relating to motor boats.

During the fiscal year passenger ships on 314 voyages brought 55,603 steerage passengers to the United States, compared with 67,988 such passengers in 1918, 147,493 passengers in 1917, 154,057 in 1916, 211,057 in 1915.

Motor Boats.

The general resumption of the use of motor boats has extended the usefulness of our inspection vessels in safeguarding the lives of those using them.

The act of June 7, 1918, requiring the numbering of undocumented motor boats went into effect December 7, 1918, and is quite generally complied with, especially in those sections where we have facilities for the enforcement of the law. Up to July 1 of this year there had been numbered 91,916 motor boats. It is estimated that there are approximately 250,000 motor boats in the United States, perhaps 200,000 of which are subject to this law. For its enforcement it is essential that the Department should have additional facilities.

There have been turned over to us by the Navy Department two small motor boats used by them during the war as station patrols which are especially adapted to our service. The House Committee on Appropriations has included in the deficiency bill for 1920 a provision which will enable us to place these vessels in operation about the first of March and continue their use during the balance of the fiscal year. We will thus be able to cover with our five vessels the Atlantic and Gulf coasts, Mississippi River and tributaries, and place one vessel on the Great Lakes.

The inspection forces of the Bureau of Navigation are cooperating with the Internal Revenue Bureau in the collection of taxes imposed on the use and business of motor boats. The revenue derived from the work of these inspection boats of the Department in the collection of taxes and navigation fines should be greatly in excess of their cost of operation.

CONCLUSION.

Need for a Unified Government Commercial Organization.

Section 3 of the organic act of February 14, 1903 (32 Stat., 825), provides as follows:

It shall be the province and duty of said Department to foster, promote, and develop the foreign and domestic commerce, the mining, manufacturing, shipping, and fishery industries, the labor interests, and the transportation facilities of the United States; and to this end it shall be vested with jurisdiction and control of the departments, bureaus, offices, and branches of the public service hereinafter specified, and with such other powers and duties as may be prescribed by law.

So much of the foregoing as relates to labor interests is superseded by the organic act creating the Department of Labor. The balance remains in full force and vigor. There is no other department of the Government charged by law with the broad duty to foster, promote, and develop the foreign and domestic commerce, etc., of the United States. It is assumed that this law was meant to be taken seriously; that the duties imposed by it upon the Department of Commerce were real duties; and that it should have the authority and the responsibility of performing them. It is, perhaps, not too much to assume that the Department of Commerce was, within the sphere which is above outlined, intended to have the same authority and influence that the Treasury Department has in finance, the War and Navy Departments in their respective fields of military effort, the Agriculture Department in the field of agriculture, the Department of State in diplomacy, and, indeed, each of the other executive departments within its lawful field.

Such is, however, not the case. Other bodies exist who perform in whole or in part the duty charged by law upon the Department of Commerce. In writing frankly of the actual situation it should be premised that the matter is not discussed in any spirit of complaint, nor is there any thought of criticism of persons or of specific bodies. The subject under review is a matter of organization, and the question being discussed is whether our present organization is fitted to cope effectively with the serious commercial problems that face the country.

Any review of the commercial work of the Government must show that the absence of organization is its most conspicuous feature. There is an excess of organizations; too little system. Numerous bodies exist, functioning more or less in the same field or with direct action therein, each independent, without coordination, without liaison, without the obligation on the part of any of them to inform the others. In short, there exists in our public commercial organization very much the same condition that existed in the allied armies before unity of command was secured. It would not be questioned that before that time the commanders of the allied and associated forces were sincere, competent, and devoted men. Each, in his own separate sphere, was doing his best and trying to support his allies as fully as he could. The difficulty was, of course, that the spheres were separate. Just so it is in our Government commercial organization. Different bodies, composed of able and earnest men, function separately on

commercial subjects at home and abroad, without mutual plan, without frequent consultation, and often in entire ignorance of what the others are doing.

The War Finance Corporation is given authority to furnish credits to the extent of a billion dollars "in order to promote commerce with foreign nations." There is no doubt this function will be performed by them wisely and well, so far as the law permits; but there is no obligation to coordinate their work with that of the Department of Commerce, although this last is charged to "foster, promote, and develop the foreign and domestic commerce" of the country. The management of the War Finance Corporation has shown marked courtesy to the Department of Commerce, but there exists no close cooperation.

The Federal Reserve Board admirably performs a function of vital importance to our commerce and finance. One can only speak of it in terms of approval and admiration, but, so far as the Department of Commerce is concerned, it functions separately, without obligation of either consultation or of cooperation.

The Interstate Commerce Commission performs functions of high value in our domestic and foreign commercial life; but it performs them as a separate organization. It probably does not occur to the distinguished members of that useful body to either consult or cooperate with the Department of Commerce, or that the latter has any interests or functions in common with it.

The Shipping Board provides for the carrying of our commerce to the ends of the earth and, through its officers and representatives abroad, takes an important, if not a vital, part in our commercial activity, but the Department of Commerce is not represented upon the Shipping Board and, except as a matter of courtesy, can not influence or guide it.

The Federal Trade Commission has duties of high importance vitally affecting our domestic and our foreign trade; but no representative of the Department of Commerce forms a portion of that body, nor is there existing any obligation for that commission to function in close relation with the Department of Commerce.

The International High Commission, of which the Secretary of the Treasury is the ex officio chairman, is a composite body representing the United States and the other American Republics. It has distinctly commercial functions, among them the provision of uniform regulations for commercial travelers, of uniform arrangements for the classification of merchandise, for customs regulations, for consular certificates and invoices, and

for port charges. It gives special consideration to the protection of patents and trade-marks and deals with the extension of arbitration for adjusting commercial disputes. It is a useful and dignified body, whose work touches closely that of the Department of Commerce. It is in no respect inharmonious, but it is separate. The Department of Commerce has no legal relation to it. A list of its publications is found upon page 59 of the Hearings Before the Committee on Foreign Affairs, House of Representatives, Sixty-fifth Congress, third session, on the diplomatic and consular service appropriation bill, under date of December 11, 1918.

The Railroad Administration, through its power to embargo freights, to grant or remove export rates, may at times exercise a controlling power over both our domestic and foreign commerce; but it has under the law no relation to the Department of Commerce and, save as a matter of courtesy, does not assume that there is any joint field of endeavor.

The Department of State, for reasons admitted by all to be good and sufficient, maintains foreign-trade advisers and a force for the purpose of gathering foreign-trade information. The relation between that department, especially through its Consular Service and the foreign-trade advisers and the Department of Commerce, is intimate and cordial. It has been a privilege to express admiration for the fine and fruitful work of the Consular Service. There is a "no man's land" wherein the diplomatic field runs parallel with the commercial and the commercial field touches closely upon the diplomatic. It will probably always be necessary to maintain a species of joint endeavor between the two departments.

The Department of Agriculture, through several services, assists or supervises large commercial transactions at home and abroad, and does so ably and with advantage to the country.

Again, let it be emphasized that the relations between these various bodies are not frictional, but cordial. The men comprising the various groups are friends. They realize they are working to a common end. I repeat, the question is not one of individuals, but one of organization. There can be no clear-cut commercial policy carried out by separate bodies in the commercial field that do not interfunction. Any industrial organization composed as is the commercial organization of the Government would fail, for the seeds of decay are planted in the very separateness of the component parts. It is not urged that these bodies should cease to be or that their functions should be altered.

There are separate duties belonging to each, although many of those duties lie in a common field with the Department of Commerce.

It is, however, strongly urged that each and every one of these separate services should be linked formally to that Department which alone the law charges with the duty to "foster, promote, and develop the foreign and domestic commerce" of the country.

Is there sound reason why there should not be a representative of the Department of Commerce upon the War Finance Corporation, upon the Federal Reserve Board, upon the Federal Trade Commission, upon the Shipping Board, upon the Interstate Commerce Commission, or upon the Railroad Administration? If such reason exists, what is it? On the other hand, is it the public purpose and intent that the Department charged to "foster, promote, and develop the foreign and domestic commerce" of the country should do it only in part, subject to the kindly and unintentional, but nevertheless real, competition and control of others charged with different duties, indeed, but so acting as in some measure to perform or to control the performance of this work?

Very clearly either the Department of Commerce should be so organized as to perform its important function effectively or it should not. If it should not do so, then the organic law dictating its functions should be modified, and it should cease to be in name what it is hardly in fact, the Department of Commerce. Or, on the other hand, it should be recognized that it is really the center of commercial organization on the part of the Government, and as such these various independent bodies should so be headed up into it that the world of commerce and the business man may know there is one head for commerce as there is one for agriculture, as there is one for war, as there is one for the Navy, and not a congeries of unrelated parts which operate, indeed, in personal harmony and peace, but without those effective results which alone can come from systematic and unified effort.

The foregoing report is respectfully commended to your attention and to that of Congress.

Respectfully,

WILLIAM C. REDFIELD,
Secretary.

REPORT OF THE SECRETARY OF LABOR.

DEPARTMENT OF LABOR,
OFFICE OF THE SECRETARY,
Washington, D. C., November 10, 1919.

To the PRESIDENT:

The great world conflict was only in a very superficial sense a contest between armed men. In a deeper sense it was a conflict between organized peoples. Victory was determined by the superior ability of the peoples of the allied and associated nations to keep their troops in the field properly supplied and equipped with the necessary materials and munitions of war.

He would be ungrateful indeed who did not recognize that the chief burden of the war was borne by those who risked their lives. But it detracts nothing from their share in the victory to realize that the forces of the world democracies would have been helpless had they not had behind them united peoples and effective industrial forces. Back of the armed men were ships which sped across the ocean with the products of American labor, and railroads which transported those products to the seaboard; behind the railroads in turn were warehouses, workshops, factories, and mines. All these are in the long run but different forms of labor; and had any of this labor faltered we should not now be preparing to enjoy the blessings of peace and liberty.

There have been some speculation and some unfortunate disputes as to the nation which contributed in greatest part toward the winning of the war. Such discussions are futile. But it is of the highest importance that we realize that the thing which did make victory possible was labor. The efficiency of our Nation in war was determined—as was the efficiency of all other nations—by our ability to direct our labor, whether manual or managerial, most efficiently toward a common end. And that I conceive to be one of the chief merits of democracy—that under it men can most readily cooperate toward a common end, whether in war or peace.

The importance of labor was no more a fact during the war than it had been during peace. But the exigencies of that conflict stripped

away many of the confusions of thought which had theretofore concealed the central truth that man does not live either upon the stored-up wealth of the past or by discounting the future but by his present labor.

Because war had accentuated this truth, which is as old as man, we devoted much governmental effort toward the affairs of our wage earners in war that we should have devoted before in peace. The war, therefore, resulted in a gigantic expansion of the functions of the Department of Labor. With the coming of peace many of these were discontinued, some properly so, because they were purely war functions. It is a matter of regret, however, that others were abandoned, for they are as needful in peace as in war. It is a matter of regret in particular that two agencies which were of special importance have had to be practically abandoned. Although the organic act of the Department of Labor specifically charges the Department with improving the working conditions of wage earners and advancing their opportunities for profitable employment, two services of the Department devoted to the first object—the Working Conditions Service and the United States Training Service—have been of necessity abandoned, while the one devoted to the latter object—the United States Employment Service—has been forced to curtail its work.

INTERNATIONAL LABOR CONFERENCE.

In world-wide interest and historical significance the most important phase of the work of this Department since its last report relates to the first meeting of the General Conference of Representatives of the Members of the League of Nations for labor adjustments held pursuant to those provisions of the treaty of peace with Germany which are comprised in Part XIII. This meeting convened at Washington October 29, 1919. In order to report upon the activities of the Department of Labor with reference to this meeting, as well as for further reasons, I am extending my annual report beyond its fiscal year and as nearly as possible up to the date of transmission.

Part XIII of the treaty of peace with Germany, which includes all the articles thereof between article 386 and article 428, establishes a permanent international organization of labor on the basis of social justice. Its method is the promotion of what it characterizes as an urgently required improvement of those existing conditions of labor which involve such injustice, hardship, and privation to large numbers of people as to produce unrest so great that the peace and harmony of the world are imperiled. Specific suggestions by the treaty for this improvement include recognition of the principle of freedom of association; regulation of working time and labor supply; prevention of unemployment; provision for an adequate living wage;

protection of workers against sickness, disease, and injury arising out of employment; protection of children, young persons, and women; provision for old age and injury; protection of workers when employed in countries other than their own; and organization of vocational and technical education.

The permanent international organization so established consists of a General Conference of Representatives of the Members of the League of Nations, together with an International Labor Office to be controlled by a Governing Body and to be located at the seat of the League of Nations as part of the league. The general conference is composed of four representatives of each member of the League of Nations. Two of these representatives are Government delegates: the other two respectively represent employers and workers and are chosen by each Government in agreement with the industrial organizations most representative of employers or of working people, as the case may be, in their respective countries. The Governing Body consists of 12 persons representing Governments, 6 representing employers, and 6 representing wage earners. The Director of the International Labor Office, who chooses his own staff, is appointed by the Governing Body and is subject to its instructions. Disputes among members are appealable to the Permanent Court of International Justice provided for in article 14 of the treaty, which is part of the covenant of the League of Nations.

The first meeting of the general conference is provided for by Chapter IV and its Annex in Part XIII of the treaty. This chapter, entitled "Transitory provisions," is devoted, together with its annex, to the first meeting of the general conference. Therein the treaty requires the first meeting of the conference to take place in the month of October, 1919, at Washington. It is also therein required that arrangements for the convening and the organization of such first meeting should be made by the Government of the United States, and to this end our Government was therein and thereby requested to convene the same.

Subsequently, by joint resolution, Congress adopted the following authorization, which was approved August 15, 1919:

That the President of the United States be, and he hereby is, authorized to convene and to make arrangements for the organization of a general international labor conference to be held in Washington, D. C.: *Provided, however,* That nothing herein shall be held to authorize the President to appoint any delegate to represent the United States of America at such conference or to authorize the United States of America to participate therein unless and until the Senate shall have ratified the provisions of the proposed treaty of peace with Germany with reference to a general international labor conference.

By authority of the aforesaid resolution the Department of State sent an invitation, through the American embassies and missions

abroad, to the countries named in the annex to the League of Nations covenant. The invitation was in the following terms:

The President of the United States, in accordance with the provisions of Part XIII of the treaty of peace between the allied and associated powers and Germany signed at Versailles on June 28, 1919, and under authority vested in him by Congress, hereby convenes the first meeting of the annual labor conference therein described to assemble in Washington at noon on the 29th day of October, 1919.

The Government of the United States extends to each nation which is or which prior to the said meeting shall become a member of the international labor organization as defined in article 387 an invitation to send its delegates and other representatives to Washington for the purpose of attending such conference.

Meanwhile, by oral direction of the President, the Department of Labor had undertaken informally the administrative details of the work to be done by the United States in making arrangements for the convening and the organization of the first meeting of the general conference described above. By order thereupon made by the Secretary of Labor, of date July 24, 1919, Nathan A. Smyth (alternate to Samuel Gompers on the International Organizing Committee for the International Labor Conference) was appointed Assistant to the Secretary of Labor to act for the Department of Labor in working out the details hereunder outlined; and by subsequent order of the Secretary, E. H. Greenwood was appointed to assist and represent Mr. Smyth. The details so intrusted to Mr. Smyth and Mr. Greenwood were as follows:

1. Preparation, in connection with the State Department, in readiness for transmission so soon as the President may deem it possible, of—

- (a) The call convening the conference.

- (b) The invitation to the International Organizing Committee to meet in this country.

2. Consideration and preparation of such legislation, if any, as may be necessary—

- (a) To authorize the President to invite the labor conference to meet in this country.

- (b) To authorize the President to invite the International Organizing Committee to meet in this country.

- (c) To provide funds.

- (d) To authorize the President to appoint delegates.

3. Preparation of a plan of organization to be put into effect as soon as action is authorized covering—

- (a) The organization of necessary committees on arrangements, reception, etc.

- (b) The securing of space in buildings, translators, stenographers, printing, etc.

4. Suggesting to departments and bureaus of the Government concerned and to such organizations as the American Federation of Labor, manufacturers' associations, etc., the compilation of data concerning the agenda for the next meeting, for the use of our delegates when appointed.

5. Such other details as may be found necessary.

All preliminary details having been attended to in anticipation of the first meeting of this general conference, the Secretary of Labor, under date of October 11, 1919, made the following announcement through the Secretary of State:

In view of the uncertainty as to just when the peace treaty will become effective and as to how many nations, if any, will be members of the League of Nations by October 29, the date set for the convening of the International Labor Conference, I beg to announce that the following policy has been determined upon:

1. The Secretary of Labor, in accordance with the call issued by the President, will open the conference at the time specified in the call and receive the credentials of the delegates if any are there presented.

2. If, at the date of the opening of the conference, the treaty has become effective through ratification by the requisite number of powers and a League of Nations is in existence and properly authorized representatives of any members of such league are present at the time of the opening of the conference, the Secretary of Labor will proceed to call such conference to order and to organize it. It will then be within the province and power of the duly qualified representatives then and there present to take such adjournment, if any, as they may deem wise in order that, before proceeding with the agenda, a more complete membership of the league may be secured.

3. If the treaty has not become effective by October 29, or if it has no qualified representatives of members present, the Government of the United States will adjourn further steps in the organization of the conference until a date when it may be expected that sufficient duly qualified representatives of members can be present so that the organization of the conference may be perfected.

The foregoing policy is based upon the following considerations:

There is no provision in the treaty under the authority of which any Government, or any body of representatives of any Government, can postpone the conference or authorize its convocation other than in the month of October. If the conference is not convened in October it can not be convened at all without an amendment to the treaty.

Under the treaty, the conference has complete power to determine its own mode of procedure. If, therefore, there are any duly qualified members of the conference present when it is convened they have unquestionable authority to provide for such adjournment as they may deem advisable. Under ordinary parliamentary procedure less than a quorum may adjourn a meeting from time to time until a quorum is present.

Under the treaty the Government of the United States is given authority not only to make arrangements for convening but also for the organization of the conference. The conference has been duly called for a date within the month of October. The power to organize the conference impliedly and necessarily carries with it the power to hold the conference open until such later date as it may be possible to fully organize it. While the power to convene ends with the convocation of the conference, which must under the treaty take place in October, the power to organize is a continuing power which is not specifically limited in the treaty and necessarily must last on until such time as the conference is sufficiently organized with qualified members to be able to take over the direction of its own procedure.

The general conference convened in its first meeting on Wednesday, October 29, 1919, in the conference room of the Pan American Union at Washington. There were representatives present from 32 nations.

The following persons were chosen as the permanent officers of the conference: President, William B. Wilson, Secretary of Labor of the United States; secretary general, Harold B. Butler, secretary of the British ministry of labor; deputy secretaries general, Dr. G. Pardo, of the Italian ministry of labor, and Mr. Ernest H. Greenwood, of the United States Department of Labor.

The conference then proceeded to discuss the admission of certain other States which had made application for admission and of certain

others which had been proposed. Of these, Germany and Austria were admitted at once, there being but a single dissenting vote. With respect to Finland, however, much controversy arose, with the final result that the conference took the view that its power to admit Finland was debatable. It therefore merely invited the delegates of that country to take part in the conference on the same conditions as obtained in the case of other countries which had not adhered to the covenant. With respect to Mexico, Luxemburg, and the Dominican Republic no action was taken, nor was there any ruling with respect to their admissibility, it being felt that since no formal application had been made by any of those three countries, no action taken by the conference looking toward their admission would be proper under the circumstances.

The conference then undertook discussion of the five subjects set forth in the agenda as specified in the treaty of peace with Germany. Those subjects are as follows:

1. Application of principle of the 8-hour day or of the 48-hour week.
2. Question of preventing or providing against unemployment.
3. Women's employment:
 - (a) Before and after childbirth, including the question of maternity benefit.
 - (b) During the night;
 - (c) In unhealthful processes.
4. Employment of children:
 - (a) Minimum age of employment;
 - (b) During the night;
 - (c) In unhealthful processes.
5. Extension and application of the international conventions adopted at Berne in 1906 on the prohibition of night work for women employed in industry and the prohibition of the use of white phosphorus in the manufacture of matches.

At the date of this report the conference was still in session.

THE NATIONAL INDUSTRIAL CONFERENCE.

Second only in potential importance to the International Labor Conference, and far transcending it in potential consequence to our important domestic affairs, was the National Industrial Conference. During the war industrial peace had been maintained by a patriotic spirit on the part of both employers and wage earners which made them more willing than they would ordinarily have been to sink all except their most pressing disagreements in order that we might present a united front against the common enemy. Many of their agreements ran only for the term of the war. The greater part of them, if not actually terminated in fact by the armistice, were at least terminated in spirit. The truces which had been declared during the war were recognized on all sides as provisional. Workmen who had long exercised the right to organize and strike, and employers who had long exercised contracting privileges, did not consider themselves as having permanently abandoned their powers in those

respects. On the other hand the general feeling was that they still possessed those powers in the fullest measure, but that temporarily the public necessity had superseded a purely private prerogative.

The fact that war arrangements were considered as provisional rendered it all the more imperative that some permanent understanding be arrived at by which a new basis for the future conduct of industry might be reached. Many disputes were no less bitter for having been suppressed and many a smoldering fire was but awaiting the critical moment to burst into flame. This situation was rendered all the more acute at the close of the fiscal year by the discontinuance of the National War Labor Board, to which during the war had been referred all those disputes which it had been found impossible to adjust by mediation or conciliation. Coupled with these considerations was the fact that the repression of grievances had created a nervous tension which strained former good relations to the breaking point. In addition, our own country, although our basic conditions were sound, suffered from the reflex of a disorganized Europe. The activities of war which had taken the place of normal industry and commerce had been abandoned and the peaceful channels of trade had not yet been reestablished. In view of this it was imperative that in the work of reconstruction a genuine spirit of friendliness and cooperation between the workers and employers of the United States be established.

A call was therefore issued by the President on September 3, 1919, for a National Industrial Conference, to be participated in by conferees who fell in general within three classes—those representing the employers of the Nation, those representing the wage earners, and a third group who should represent the public itself and assist the other two groups in arriving at a common viewpoint. Accordingly, letters were directed by the President to the principal organizations of employers and wage earners of the United States asking them to name delegates in equal numbers. This was a relatively simple proceeding so far as wage earners were concerned, for practically all the organized workers in the United States are banded together within the American Federation of Labor. The president of that organization, Mr. Samuel Gompers, was, therefore, requested to name the fifteen delegates. With regard to employers the situation was more difficult, for there is no single outstanding organization which includes all organized employers in the same sense that the American Federation of Labor includes all organized working people. The choice of the representative of employers was consequently left to the directing heads of several business organizations. Letters were addressed to Mr. Magnus W. Alexander, managing director of the National Industrial Conference Board, requesting that he name five representatives; to Mr. William G. Baker, jr., president of the Invest-

ment Bankers' Association, requesting that he name two; and to Mr. Homer L. Ferguson, president of the Chamber of Commerce of the United States of America, requesting that he name five. In addition, representation was granted to the employing farmers through the naming of one delegate each by Mr. Oliver Wilson, president of the National Grange, Mr. C. S. Barrett, president of the National Farmers' Union, and Mr. J. N. Tittimore, president of the American Society of Equity. The following letter, addressed by the President to Mr. Gompers, sets forth the purpose of the meeting. It is a replica of those sent to the other persons named:

For the purpose of reaching, if possible, some common ground of agreement and action with regard to the future conduct of industry, I desire to obtain the combined judgment of representative employers, representative employees, and representatives of the general public conversant with these matters, and for the accomplishment of that purpose I have decided to call a conference of five persons to be selected by the Chamber of Commerce of the United States of America, five persons to be selected by the National Industrial Conference Board, fifteen persons to be selected by the American Federation of Labor, three persons to be selected by the farming organizations, and two persons to be selected by the investment bankers, to confer with fifteen representatives of the general public whom I shall select, these representatives to meet in the City of Washington on October 6, 1919, for the purpose of consulting together on the great and vital questions affecting our industrial life and their consequent effect upon all our people, to discuss such methods as have already been tried out of bringing capital and labor into close cooperation, and to canvass every relevant feature of the present industrial situation, for the purpose of enabling us to work out, if possible, in a genuine spirit of cooperation a practicable method of association based upon a real community of interest which will redound to the welfare of all our people.

The wastages of war have seriously interfered with the natural course of our industrial and economic development. The nervous tension of our people has not yet relaxed to normal. The necessity of devising at once methods by which we can speedily recover from this condition and obviate the wastefulness caused by the continued interruption of many of our important industrial enterprises by strikes and lockouts emphasizes the need for a meeting of minds in a conference such as I have suggested. I am sure that your organization will gladly bear the expense of its own representatives to a conference called for such an important purpose, and I would therefore request that you select fifteen persons to act as the representatives of the American Federation of Labor in the conference, and advise the Secretary of Labor of the names and addresses of the persons selected so that he may make the necessary arrangements for the meeting.

Subsequently two persons were added to the employers group to represent railroad management, four were added to the representatives of labor to represent the four railroad brotherhoods, and a number of additional persons were added to represent the public.

By direction of the President the preliminary arrangements for the conference were carried on by the Department of Labor. The conference convened on October 6, at the Pan American Union Building in the city of Washington. The Secretary of Labor as temporary chairman, with Hon. Rowland B. Mahany as temporary secretary organized the conference, after which Hon. Franklin K. Lane (Sec-

retary of the Interior) was chosen permanent chairman and Hon. Lathrop Brown permanent secretary. The Secretary of Labor was invited to sit in the conference as an advisory member, and did so.

Rules were adopted which provided for group action. Under these rules no proposal introduced by any single delegate could be considered by the conference unless it had first received the assent of the majority of the group of which the proposer was a member. Nor could any final determination of policy or statement of a guiding principle be arrived at by the conference unless the proposal in question had received the votes of the majority in each group. Acting upon this basis, the conference proceeded to discuss many resolutions which were introduced.

From the beginning it was evident that no decision could be reached unless an understanding was had with regard to the right of collective bargaining. Originally introduced as a substitute for a resolution to mediate in the pending steel strike, this subject was almost the only one which received consideration. Finally, on October 21, all proposals then pending or submitted by any of the three groups were rejected by the conference. At this point it appeared that certain of the delegates had come to the conclusion that further discussion was futile and were upon the point of withdrawal. An adjournment was agreed upon, however, and the following morning a letter, addressed by the President to the conference, was read before the body. That letter, which urged it to continue in session, was as follows:

I am advised by your chairman that you have come to a situation which appears to threaten the life of your conference, and because of that I am presuming to address a word of very solemn appeal to you as Americans. It is not for me to assess the blame for the present condition. I do not speak in the spirit of criticism of any individual or of any group. But having called this conference I feel that my temporary indisposition should not bar the way to a frank expression of the seriousness of the position in which this country will be placed should you adjourn without having convinced the American people that you had exhausted your resourcefulness and your patience in an effort to come to some common agreement.

At a time when the nations of the world are endeavoring to find a way of avoiding international war, are we to confess that there is no method to be found for carrying on industry except in the spirit and with the very method of war? Must suspicion and hatred and force rule us in civil life? Are our industrial workers to live together without faith in each other, constantly struggling for advantage over each other, doing naught but what is compelled?

My friends, this would be an intolerable outlook, a prospect unworthy of the large things done by this people in the mastering of this continent; indeed, it would be an invitation to national disaster. From such a possibility my mind turns away, for my confidence is abiding that in this land we have learned how to accept the general judgment upon matters that affect the public weal. And this is the very heart and soul of democracy.

It is my understanding that you have divided upon one portion only of a possible large program which has not fully been developed. Before a severance is affected based upon present differences, I believe you should stand together for the develop-

ment of that full program touching the many questions within the broad scope of your investigations. It was in my mind when this conference was called that you would concern yourselves with the discovery of these methods by which a measurable cooperation within industry may have been secured and if new machinery needs to be designed by which a minimum of conflict between employers and employees may reasonably be hoped for, that we should make an effort to secure its adoption. It can not be expected that at every step all parties will agree upon each proposition of method suggested. It is to be expected, however, that as a whole a plan or program can be agreed upon which will advance further the productive capacity of America through the establishment of a surer and heartier cooperation between all the elements engaged in the industry. The public expects not less than that you shall have that one end in view and stay together until the way is found leading to that end or until it is revealed that the men who work and the men who manage American industry are so set upon divergent paths that all effort at cooperation is doomed to failure.

I renew my appeal that with a full comprehension of the almost incomparable importance of your tasks to this and to other peoples, and with full faith in the high patriotism and good faith of each other, you push your task to a happy conclusion.

The labor group thereupon requested permission to withdraw temporarily for consultation. A recess was accordingly taken. Upon reconvening the conference was addressed by the chairman of the labor group, who offered the following resolution:

The right of wage earners to organize without discrimination, to bargain collectively, to be represented by representatives of their own choosing in negotiations and adjustments with employers in respect to wages, hours of labor, and relations and conditions of employment is recognized.

After discussion, which occupied two sessions, the resolution was rejected. The groups representing the public and labor, respectively, voted unanimously in its favor, but the employers group, by a divided vote, rejected it. Although an overwhelming majority of the delegates were in favor of this proposal, it was, nevertheless, not adopted, since the rules already adopted by the conference required, as stated above, a majority of each group to declare the judgment of the conference.

Following the defeat of this resolution the chairman of the labor group, speaking for that group, addressed the conference at length, announcing in concluding that in the opinion of his group nothing could be gained by remaining. Thereupon the entire group withdrew.

On the following day the conference convened with only the public group and the employers group present. The chairman of the conference, speaking for the President, announced the desire of the latter that the nature of the conference itself should be changed because of the change of conditions and that the work should be carried on by the public group alone, inasmuch as the burden of industrial quarrels falls ultimately upon the public. The wish of the President was stated by the chairman to be that the public group should continue in session as a group and make a report and give advice and suggestions as to the future industrial policy of the Nation. These proposals were to be presented to the President.

With that announcement the conference as then constituted was adjourned sine die.

The public group immediately met to canvass the possibilities. After an adjournment until the following day it met again and addressed the following communication to the President:

TO THE PRESIDENT OF THE UNITED STATES.

SIR: The delegates appointed by you as representatives of the general public in the industrial conference just closed beg to submit the following report:

The conference proper opened on October 6 and terminated on October 23, sitting in all 13 days. The public group held 23 meetings for the discussion of the various matters brought before the conference.

The public group, as was intended, differed from the other groups, representing labor and capital, in one important particular. It had not the homogeneity of interest of either of these groups; it represented rather a cross section of American life. Among its members were employers of labor, large and small, farmers, capitalists, representatives of labor, socialists, and professional students of social and industrial problems. Notwithstanding this diversity of interest and relation there was manifested throughout an astonishing amount of agreement upon the most vital subjects. This we regard as a most hopeful sign for the future and an evidence of the possibility of a united action in the interest of the entire Nation.

The existence of the steel strike had the effect of focusing interest and attention upon the present conflict as against constructive measures and agreement for the future, and made the calm discussion of such constructive measures difficult. Because it was manifestly impossible to dispose of this subject by agreement under the rules of the conference, which required concurrence of at least a majority of each of the three groups, the conference decided to defer action upon the question until the subject of collective bargaining had been passed upon.

After several days of earnest endeavor and numerous attempts at adjustment between the points of view of the several groups the conference failed to agree upon this issue.

In this connection we deem it important to emphasize the fact that the conference did not, at any time, reject the principle of the right of workers to organize and to bargain collectively with their employers. Neither the conference as a whole nor any one group in the conference opposed that right. The difficulty that arose and the issue upon which the conference failed to agree was not upon the principle involved but upon the method of making it effective.

In our judgment even this difficulty would not have been insurmountable had the conference approached its task in another way.

Obviously, the important principle of collective bargaining can not be sharply separated from other elements in the great problem of the relation of employers and employed. The right of organization, the protection, in the exercise of their lawful rights, of those who seek to organize the workers; the careful definition of the various forms of organization through which the right may be exercised; and the machinery necessary for adjusting disputes arising in connection with that right—must all be taken into account in their proper relation.

We believe that the experience of this conference, and of similar conferences elsewhere, clearly shows the futility of attempting to deal with this great question in a piecemeal way, by adopting detached and unrelated resolutions. The only efficient method, in our judgment, is that of formulating a comprehensive and systematically developed program.

We believe that the right of workers to organize for the purpose of collectively bargaining with their employers, through representatives of their own choosing, can not

be denied or assailed. As representatives of the public we can interpret this right only in the sense that wage earners must be free to choose what organizations or associations, if any, they will join for this purpose.

In the recognition of the right of workers so organized to be represented by representatives of their own choice difficulties will from time to time arise. We believe that it would be possible for a properly constituted arbitral authority to adjust such difficulties with justice and fairness to all parties concerned.

The abrupt termination of the conference prevented any discussion in the conference of the important matter of the right of workers to strike and of the methods whereby, without destroying or impairing that right, the public interest may be adequately conserved and protected.

We are deeply impressed by the necessity of setting up some machinery for effecting the speedy adjustment of disputes arising between workers and employers, whether the latter be private individuals or firms, or public and governmental authorities. In this connection there was submitted to the conference by the Secretary of Labor, Hon. W. B. Wilson, a well-considered plan for establishing the necessary machinery for conciliation and arbitration. Because this plan was not considered by the conference, owing to the manner of its termination, we do not here express any judgment upon it further than to say that we believe it affords a possible basis for a solution of the immediate problem and deserves serious consideration and study.

It is impossible to discuss in detail the numerous schemes for affording to workers representation in the regulation of the conditions of labor, the plans for profit sharing, the many forms of shop councils, and the like. We respectfully suggest that a very great service could be rendered to the Nation, to employers and employees alike, if in the Department of Labor there were established a bureau for the purpose of gathering and making available accurate information concerning all such experiments and their results. Such a bureau could give expert advice and assistance to any persons desiring to undertake plans for bettering labor conditions in particular establishments.

As representatives of the general public we are of the opinion that the standards relating to the employment of women and children advocated by the Woman's Division and the Children's Bureau of the United States Department of Labor should be favorably considered.

We do not believe that this group can at this time with advantage further proceed with the discussion of the great questions with which we have been dealing. It may well be, however, that a small committee, selected by you, composed of persons of varied interests and points of approach, could take up the matter and prepare along some such lines as herein indicated a program which will be of present value. Upon the presentation of the report of such a committee steps could be taken to give it practical effect through another conference representing capital, labor, and the public, if in the circumstances then existing it should seem to you to be wise.

In closing this report and terminating our labors, we desire to give expression to our conviction that the conference has been of very real educational value to all those privileged to participate in it. The frank and sincere interchange of opinions, views, and experiences, both within the groups and between them through individual contact, has given, we believe, to every member of the conference a broader vision and understanding and helped each to see the problems of the other.

Assuring you of our profound respect, and solicitude for your recovery, we have the honor to be,

Very truly, yours,

THE GROUP REPRESENTING THE PUBLIC.
BERNARD M. BARUCH, *Chairman*.

OCTOBER 24, 1919.

After thus presenting their views, the public group adjourned sine die, thus bringing all the conference proceedings to an end.

OFFICE OF THE SECRETARY.**THE DIVISION OF CONCILIATION.**

With the close of the last fiscal year seven cases were carried over into the present year, nearly all of which had just been brought to the attention of the department. All these were speedily settled, with one exception.

The war-time machinery of many of the governmental agencies continued to function until a few weeks after the signing of the armistice, November 11, but it was soon evident that, although legally our Nation was still in a state of war, both employers and employees, nevertheless, considered the war as practically at an end. It soon became more difficult to handle the disputes which arose than during the period in which our country was actually engaged in war. This was not only our own experience, but it was the experience of governmental agencies with which the Department of Labor had worked in cooperative relations. Following the signing of the armistice and the beginning of demobilization the existing good relations between employers and wage earners were very much disturbed. This was noticeably reflected in the attitude of all persons engaged in the manufacture of war materials. During the latter part of 1917 and during 1918, harmonious relations had been agreed to by all in order that our military needs should be taken care of promptly and efficiently. A patriotic impulse had stirred both the employer and the worker and many differences that, based upon our experience in normal times, would have caused a suspension of operations were very lightly passed over and adjusted without recourse to either strikes or lockouts. So, during the period from July 1 to November 11—what may be called the war months—the Division of Conciliation encountered few difficulties in making harmonious adjustments. From November 11 until the present date, the readjustment of industry from war to peace time activities, the reemployment of demobilized soldiers, and the transfer of workers from war industries to normal production have all contributed to the general unrest so noticeable not only in our country but throughout the world.

When the armistice was signed the Division of Conciliation immediately entered into cooperation with all governmental branches interested in the various grave problems of industrial readjustment. With the termination of war emergency appropriations on June 30, 1919, many war-emergency organizations ceased to function wholly or in part. As a consequence, various branches of the Department of Labor were called upon to take over some part of their activities, and the Conciliation Division, therefore, found it necessary to do its part. The problems of readjustment were many. Methods of conciliation employed in normal times and in war times had to be changed to meet new conditions. The sudden cessation of war was followed

immediately by the cancellation of war contracts and the temporary closing down of many industries for the purpose of installing machinery and equipment for the resumption of the manufacture of the customary peace-time products. The demobilization of the Army soon followed the demobilization of our huge industrial army of workers and added to the burden through the introduction of large numbers of unemployed—always a cause of unrest. The cases handled by the department at this time presented many new and perplexing problems caused by the transition processes, and while in most instances it was more difficult to secure as speedy settlement as usual, the high general average of satisfactory adjustments was gratifying.

It must be remembered that during the entire time our country was engaged in war not a single general strike occurred in any important industry, and for months at a time there was not a serious dispute in the coal industry, the shipbuilding industry, the lumber industry, the oil industry, or on the transportation systems of the United States.

As has been stated in previous reports, the Department of Labor has no power and exercises none through this division to make decisions or awards in disputes submitted to it. It can not hand down an award and then demand that the employers and employees concerned shall abide by its decisions. The work of conciliation is more diplomatic than judicial. Conciliators act as industrial peacemakers, endeavoring to get contending parties together, so that they may more readily agree upon a solution of their own problems in their own way, suggesting methods and alternatives that have been proved, and that tend toward a peaceful adjudication of the matters in dispute. It has been the policy of the Department of Labor not to endeavor to impose its viewpoint upon either the worker or the management in any dispute that may arise, but rather to find some basis mutually acceptable, even though it may not be mutually satisfactory. It is in this spirit that all our problems of conciliation in labor controversies are approached. As a result conciliators are often able to remove the barriers which prevent employers and employees from meeting on common ground, and thus the way is paved for freer relations and a broader grasp of their respective rights and corresponding obligations. The fact is brought home to each that there is another side; and even in the absence of immediate success, the seed has been sown which bears fruit in some modification of working conditions or a greater consideration for the human rights of employees and a better understanding of the problems which have harassed employers. Labor has discovered that it has a standing before the Government whenever its demands are based on industrial and constitutional rights; employers, on the other hand, have found the Department a defender against unreasonable exaction. In a majority of the cases presented for mediation a fine spirit of cooperation was shown by both employers and employees.

The success which has attended the Department's efforts in the great majority of disputes has been most gratifying. The volume of work is shown briefly in the following table:

Month.	Workmen affected in all cases.	
	Directly.	Indirectly.
1918.		
July.....	99,616	181,915
August.....	65,596	128,843
September.....	75,172	166,700
October.....	67,503	103,205
November.....	112,307	77,827
December.....	81,931	99,758
1919.		
January.....	51,667	49,423
February.....	141,870	198,279
March.....	48,367	91,028
April.....	118,266	76,236
May.....	107,149	79,398
June.....	42,324	83,460
Total.....	1,011,968	1,336,072

Reference to the five preceding annual reports will show a steady increase in the number of cases handled, although some allowance must be made for deviation from the normal on account of the war. The growth of the Division of Conciliation of the Department of Labor is indicated in the table appended:

	Mar. 4, 1913, to June 30, 1914.	1915	1916	1917	1918	1919
Number of cases.....	33	42	227	378	1,217	1,780
Adjusted.....	28	26	178	248	865	1,223
Unable to adjust.....	5	10	22	47	71	111
Pending.....		5	21	42	7	13
Unclassified.....		1	6	41	66	a 214
National War Labor Board.....					208	219

a In 64 of the cases reported as unclassified in the table, commissioners of conciliation found upon arrival that the disputes were in satisfactory process of adjustment without departmental aid; in 37, conciliators' services were no longer necessary by reason of the fact that strikers had secured employment elsewhere and did not care to resume relations with their former employers; 32 cases were terminated through the closing of plants by employers either for repairs or because of retirement from business; in 32 cases satisfactory settlements had been reached prior to the arrival of the conciliators assigned; in 59 cases adjustments were reached but are not credited to the Department because its commissioners of conciliation acted in conjunction with representatives of State boards, local committees, or local municipal officials.

California oil settlement.—Through the efforts of Hon. Verner Z. Reed (since deceased), a member of the President's Mediation Commission, an agreement was reached as a war measure in November, 1917, which established an eight-hour day and \$4 minimum wage throughout the industry in the State of California, and set up a Government body known as the Federal Oil Inspection Board to interpret the terms of this agreement and adjudicate future labor disagreements. This was accomplished without a cessation of work in the industry.

The members of the Federal Oil Inspection Board tendered their resignations to the Secretary of Labor on May 12, 1919, and the services of the board terminated. A demand by the oil workers for increased wages and changed working conditions and the resignation of the Federal Oil Inspection Board made it advisable for the President's Mediation Commission to proceed to California in July, 1919, for the purpose of adjudicating the claims of the men, setting up new machinery for the settlement of future disputes, and negotiating, if possible, a new agreement which should cover peace-time conditions.

Hugh L. Kerwin, Assistant to the Secretary of Labor, and Col. J. L. Spangler, and E. P. Marsh, members of the President's Mediation Commission, proceeded to California and conducted negotiations which resulted in a new agreement in the industry, directly affecting 15,000 workmen, to be in force until June 30, 1920. With the exception of the Standard Oil Co., all the larger producing and refining companies and many of the smaller ones participated in the conferences which brought about an agreement. The agreement provides for a minimum wage for semiskilled workers of \$5 a day, a horizontal increase of 75 cents a day per man dating from July 1, 1919, retroactive pay from January 1, 1919, of 50 cents a day per man, a union nondiscrimination clause, and a provision that within 60 days of the termination of this agreement both sides should be called into conference by the President's Mediation Commission or by the Secretary of Labor for the purpose of negotiating a new agreement.

Hon. Hywel Davies, of the Department of Labor, was named as labor adjuster to interpret and administer the terms of the agreement. The following clause in the agreement is worthy of mention:

The duties of the adjuster shall be to familiarize himself with operating conditions and from time to time make representations to the operators or to the men as to any matter which he deems should be changed for the welfare of the industry as a whole.

It is a source of particular gratification to the Department of Labor that from the date that Hon. Verner Z. Reed first intervened up to the time of the renewal of the agreement just described there has been no cessation of work in this industry in California due to labor controversy.

The New York Harbor situation.—Of predominating influence in overseas shipping in normal times, the port of New York during the war was of an importance that can not be overestimated. Through it passed the bulk of our men and supplies. Any interruption to shipping activities at the port would have meant immediate congestion and would have cut the main line of communication with the allied front. As stated in the Secretary's annual report for 1918, the Department of Labor has been actively in touch with labor conditions in the port since the early part of 1917, when a threatened strike of harbor employees led to the assignment of Mr. James L. Hughes as

commissioner of conciliation to endeavor to bring about a settlement of the dispute. Subsequently a board of arbitration was set up, composed of a representative each of the Shipping Board and the Departments of Labor and Commerce. Mr. Ethelbert Stewart was designated to represent the Department of Labor. Mr. Benjamin M. Squires, commissioner of conciliation for the Department, was detailed as administrator, and later, upon the resignation of Mr. Stewart, served also as a member of the board, and finally as chairman.

No interruption to harbor traffic occurred during the period of hostilities, though more than a thousand complaints were handled, any one of which if not dealt with promptly might have precipitated a strike. After the signing of the armistice employing interests in the harbor took the position that they were no longer bound by their agreement to arbitrate "during the period of the war" and refused to be bound by any award that might be made by the board of arbitration. Reference to the War Labor Board was also refused. The result was a three days' strike in January, 1919, terminated only by a cabled request from the President that the War Labor Board hear and determine the case and by direct appeal from the Secretary of Labor that the men return to work. Following the award of the War Labor Board another strike occurred, completely paralyzing shipping at the port. In the absence of Mr. Squires, Commissioner Hughes was again detailed to assist in adjusting the dispute and succeeded in bringing about a settlement in the case of employees on Government-operated craft. Private employers stood out, however, and a settlement was not reached until the men had been out seven weeks. Then by intercession of the mayor, the Secretary of Labor, and other Government officials a permanent board of arbitration was created by employers and employees.

The Department was also a party to the agreement creating the National Adjustment Commission for the adjustment of wages and working conditions of men engaged in loading and unloading vessels. The record of this commission is as enviable as that of the New York Harbor Board in that no stoppage of work occurred during the period of actual hostilities. The commission was reorganized in September, 1919, on a peace-time basis through agreement entered into by the International Longshoremen's Association, steamship lines, and contracting stevedores, and the United States Shipping Board. Advisory representation on the commission was given to the Department of Labor, and Mr. Squires has been designated to represent the Department in an advisory capacity on the commission. By request of the commission Mr. Squires has served as executive secretary since January, 1919.

The only serious strike of longshoremen on the Atlantic and Gulf coasts since the commission was created occurred at New York,

October 6, 1919. On that date the commission made an award granting only a slight increase in wages and referring to the President's proclamation calling for a truce in wage conflicts. The entire port was tied up for a period of 10 days. Every effort was made to secure compliance with the agreement to accept the award of the commission. The American Federation of Labor called upon the longshoremen to abide by their agreement.

The matter of accepting the award was submitted to a vote of the locals of longshoremen and the strike was called off.

Jurisdictional disputes in building trades.—The building trades department of the American Federation of Labor requested the assistance of the Department in an effort to find some solution of numerous jurisdictional contentions existing in the building trades. Secretary Wilson requested Commissioner John B. Lennon to endeavor to work out a solution of the difficulties. Through Secretary Spencer and President Donlin, of the building trades department, the first conference was held in the State of New York, where the matter in a general way was discussed by the officers of the building trades and representatives of the employers' associations interested in construction work. This meeting was adjourned to a future date, when another conference was to be held in Boston. This conference was held, and a general discussion was had as to the possibility of formulating a plan for the elimination of jurisdictional disputes in the building industry of the United States. No formal work was done on the plan at the Boston meeting.

The next meeting was held in the city of Chicago, at which time a plan submitted by Commissioner Lennon was given consideration. Some changes were discussed and a few approved, and he was requested to have it formulated and submitted to the next meeting of the same representatives who had met in Boston.

The fourth and last meeting was held at Indianapolis, Ind., at which time the following representatives were in attendance, representing the organizations named: John B. Lennon, representing the Department of Labor; E. J. Russell, Walter Kilhan, and W. G. Luce, representing the American Institute of Architects; A. R. McCreary, representing Associated General Contractors of America; E. W. Reaugh, representing National Association of Builders Exchanges; John H. Donlin, William J. Spencer, William Dobson, J. J. Hynes, and John Cosgrove, representing the building trades department of the American Federation of Labor.

At this conference a plan was unanimously adopted. The conferees were by their instructions from the organizations they represented compelled to submit the matter to their various organizations for ratification. This was done and the plan was approved by all the organizations, and at the next meeting of the executive board of the building trades department the matter will be considered and un-

questionably immediate steps will be taken to put it into force and effect. During the period the commissioner was assigned to the work he visited and interviewed persons interested in the general subject in the cities of Chicago, New York, Buffalo, Kansas City, St. Louis, and several other places, and found the sentiment everywhere decidedly favorable to making the attempt to eliminate these unfortunate disputes which so often cause a stoppage of construction work. It is believed that the plan, if adopted and put into effect, will prove wholly successful. The Department was greatly assisted in bringing about this desired result by President Donlin and Secretary Spencer, of the building trades department, and also by Messrs. E. J. Russell and W. G. Luce.

Textile strikes, Lowell, Mass., and Manchester, N. H.—The Massachusetts State Board of Arbitration advised the Department of serious textile controversies in northern Massachusetts and New Hampshire which threatened to culminate in strikes on Monday, July 1, 1918. The magnitude of these controversies, which involved upward of 50,000 workers engaged largely in producing materials for the Army and Navy, was such that an early termination of the difficulties was absolutely essential. Commissioner H. J. Skeffington, of Boston, Mass., was delegated by the Secretary of Labor to conduct the negotiations. The demand of the employees was for a general increase of 15 per cent in wages. The companies met this demand with an offer of 10 per cent, and agreed to leave the matter of the additional increase of 5 per cent to the National War Labor Board for arbitration. The question not having been settled, the Lowell operatives went out on strike on July 1, to be followed shortly afterward by the Manchester workers. The Lowell mill agents appealed to the War Labor Board and the board responded by sending two examiners to Lowell to investigate the situation. Upon learning that the matter was in the hands of a representative of the Division of Conciliation, they held the proposed investigation in abeyance. Mr. John Golden, president of the United Textile Workers of America, conducted the negotiation for the employees. The question of referring the dispute to Mr. H. B. Endicott, chairman of the Massachusetts Public Safety Committee, was proposed and was finally accepted by Mr. Golden on behalf of the employees. The mill agents acquiesced in this arrangement, and the strike was declared off. Mr. Endicott rendered a prompt decision in the matter, granting the original 15 per cent increase demanded by the operatives. The Manchester strike was adjusted by granting the demands of the strikers in their entirety, the award to be retroactive to June 17, 1918. It was further agreed that, in order to insure continuity of production to the capacity of the mills throughout the war, any future question or issue arising should be referred to the National War Labor Board for adjudication.

Bridge shops, St. Louis, Mo.—A controversy having arisen in the bridge shops of St. Louis, Mo., and vicinity, the good offices of the Department were requested on April 9 by Mr. D. M. Gayton, representing the employees. Thirty shops with a personnel of about 7,000 men were involved in the controversy. Commissioners F. J. Rohde and James J. Barrett were assigned by the Department. Prior to the arrival of the conciliators, the companies had refused to meet any labor representatives, stating that there was nothing to discuss. This action had been the cause of a bitter feeling between the contending parties. Eleven of the companies involved were members of the Iron Workers and Erectors' League Association. The members of the league refused to admit any present or impending controversy, stating that their employees were happy and contented. These concerns not only declined the good offices of the Department but went so far as to refuse to meet committees of their own employees. A conference was arranged, however, of all shops not affiliated with the association, and a scale of wages was finally drawn up and approved. The following is the scale as agreed upon:

	Cents per hour.
Skilled mechanics.....	56½
Semiskilled mechanics.....	50
Helpers.....	40

While the agreement secured was not altogether satisfactory to either side, it secured a temporary adjustment and allowed the strikers to resume work. The extreme bitterness shown by the employers in this case was due to the action of the union in placing the employers' association on the unfair list some two years prior to the outbreak of the strike. The temporary adjustment of the strike, however, gives rise to the hope that this bitterness of feeling may eventually die out and that pleasant relations may again be resumed.

Magnolia Petroleum Co., Beaumont, Tex.—Federal Labor Union 15338, Beaumont, Tex., notified the Department on July 24, 1918, of a serious controversy which had arisen between the Magnolia Petroleum Co. and its employees at Beaumont, Tex., and the assignment of a conciliator was requested with a view to bringing about an adjustment. Commissioner Joseph S. Myers was named. About 250 boiler makers and 1,000 other craftsmen were found to be on strike. After a number of protracted conferences had been held, an agreement was reached which was satisfactory to all but the boiler makers, and the strike was declared at an end. The boiler makers, however, remained on strike. The issue between the boiler makers and the company was that of collective bargaining, the policy of the company having been to treat with its employees individually. The company finally agreed to meet committees of its own employees, and an election was held to designate members

to act upon these committees. This had the effect of satisfying the men, the strike was declared off, and a much better feeling engendered.

McEwen Manufacturing Co., Tulsa, Okla.—On May 5, 1919, the Department received a telegram from Edward Tegtmeier, vice president of the International Brotherhood of Blacksmiths, advising of a strike of blacksmiths and machinists at the plant of the McEwen Manufacturing Co., at Tulsa, Okla., and requesting the good offices of the Conciliation Service in making an adjustment.

Commissioner Robert M. McWade, who was then at Tulsa, was assigned to take up the matter. The trouble at this plant was caused by a demand of the management that each employee sign a document agreeing that in the event he spoiled the work upon which he was engaged he should lose the time spent on that job, the company standing the loss of material. All the employees who refused to sign were advised to get their pay and leave the plant. This brought about a strike of all craftsmen engaged at the works with the exception of a few laborers.

Commissioner McWade conferred with Mr. J. H. McEwen, president and largest stockholder of the company, and prevailed upon him to compromise the difficulties. A "gentlemen's agreement" was drawn up which provided for an open shop, with a proviso that there should be no discrimination against union employees. An eight-hour day was also granted with an understanding that there should be no strikes or lockouts, and such questions as wages, working hours, etc., to be referred to Commissioner McWade and President McEwen for adjustment. This arrangement was satisfactory to the employees, who agreed to resume work at once. Two hundred and twenty-five men were directly or indirectly affected.

Mooresville Cotton Mills, Mooresville N. C.—The discharge of 300 union employees by the Mooresville Cotton Mills of Mooresville, N. C., was reported to the Department on April 6. It was intimated that these textile workers were discharged because they had recently joined a labor union and affiliated with the American Federation of Labor.

Commissioner Charles Bendheim was assigned to represent the Department. It appeared that the mill owners in this case had posted notices notifying their union employees that unless they severed their membership at once their dismissal would follow. In pursuance of this notice 300 employees were summarily discharged. This action by the company had aroused much excitement in the town, which was a small community and undergoing its first labor disturbance. Commissioner Bendheim arranged a conference with the officials of the company and finally persuaded them that their actions were unjustifiable, and secured a promise that the action would be reconsidered. After having the matter under consideration

for some time the company concluded that its former action had been unwise and agreed to reinstate its former employees with the understanding that they had a right to retain their membership in the union but that no coercive measures should be used to induce any workers to join the organization. This action of the company was received by the employees with manifestations of delight and the best of good feeling was engendered.

Milk drivers, Chicago, Ill.—A strike of milk drivers in Chicago, Ill., was reported to the Department on May 6, and the good offices of the Conciliation Service solicited. Commissioner Fred L. Feick was immediately assigned to the case. A deplorable feature of this strike was the threatened cutting off of the supply of milk to hospitals, infirmaries, and children's institutions, as well as the threatened interruption to the delivery of milk to invalids and children generally throughout the city. Commissioner Feick exerted his energies particularly in reference to this feature of the situation, and arrangements were soon made whereby milk would be delivered to such institutions. In the meanwhile conferences were arranged and efforts made to arrive at some solution of the difficulties. Three thousand drivers were affected, and an equal number of other employees were forced from their positions in consequence of the strike. The demands of the men were for a flat increase of \$9 per week plus certain commissions. The milk dealers' association was willing to grant an increase of \$4 per week. The price of milk in Chicago had recently been reduced from 14 to 13 cents per quart, and the dealers maintained that they could not possibly grant the demands of the men without restoring the former price. A feature of the strike was the advertising campaign carried on in the press, both sides carrying full-page advertisements explanatory of their respective positions. A joint conference of all the contending parties was finally arranged by the commissioner, both sides submitting all data in their possession. It was argued that the price of milk in Chicago was from 1 to 3 cents per quart less than the price in New York, Boston, Detroit, Cleveland, and Washington, and that the restoration of the price to 14 cents, which would allow the companies to pay the increase demanded by the strikers, would not be excessive. This view of the situation was finally accepted by the milk dealers' association, and the demands of the men were granted in their entirety. An agreement was signed which provided for an increase of approximately \$9 per week, which brought the weekly wages of these men up to about \$34. It was also agreed that eight hours should constitute a night's work and 10 hours a day's work.

Kelleys Island Lime & Transport Co. settlement.—An adjustment was effected of a three weeks' strike at the Kelleys Island Lime & Transport Co.'s operations at Marblehead and Kelleys Island, Ohio.

The financial loss to the men and company was at the rate of \$20,000 a week. The New York Central Railroad had laid off six train crews and suffered a loss of freight receipts estimated at over \$30,000 a week. The workers had recently organized and demanded a signed agreement recognizing their union, elimination of Sunday work, and a reduction from 10 hours to 9 hours for a workday, with 10 hours' pay. These demands were met by a diplomatic refusal of the company to sign any agreement or grant other concessions. The strike resulted.

The commissioner in this case, Mr. Frederick G. Davis, suggested a plan that overcame the employers' objection to a settlement. The committee representing the union had informed him that the workers were able and willing to produce as much in a 9-hour day as was previously produced in a 10-hour day. The rate per hour was 35 cents, so that a 39-cent rate was necessary for 9 hours in order to equal the previous 10 hours' pay. An hourly rate of 37 cents was established, and an additional 2 cents per hour was to be paid if the average tonnage previously produced in 10 hours is produced in 9 hours. In lieu of a signed agreement with the union, a letter was addressed to the representative of the Department of Labor, signed by John A. Kling, president of the Kelleys Island Lime & Transport Co., embodying this new wage rate for a 9-hour workday, and other provisions satisfactory to the employees. To prevent possible loss in the future by unnecessary stoppage of work, the following paragraph was included:

It is mutually agreed that in case of failure to agree upon the provisions of this agreement no stoppage of works shall take place until all agencies for mediation and conciliation have been utilized.

Rath Packing Co., Waterloo, Iowa.—In March, 1919, the employees of the Rath Packing Co., Waterloo, Iowa, requested the company to put into effect the provisions of the award handed down by Judge Samuel Alschuler in the Chicago packing-house controversies. The company refused acquiescence with these demands and this was followed by a vote to strike. Mr. John Blaha, representing the employees wired the Department for the assignment of a conciliator to assist in bringing about an adjustment of the dispute. Commissioner Patrick F. Gill was detailed to effect an adjustment if possible. A joint conference of the contending parties was arranged by Commissioner Gill and the points in dispute were discussed in detail. A proposed agreement was drawn up by the conciliator and after some discussion was finally agreed upon by both sides. This agreement provided for an eight-hour day, time and one-half for overtime, a minimum wage of 42½ cents per hour for men and 27½ cents for women. It was also agreed that any future disagreement arising should be submitted to the Department of Labor before the employees would go on strike.

On May 5 the company wired the Department that the agreement entered into with its employees had been broken and the men had struck without giving the 30 days' notice which was stipulated in the agreement. Commissioner Gill's services were again requested, but because of an assignment upon which he was then detailed it was necessary to designate another conciliator. Mr. Thomas J. Williams was therefore assigned to the case. The renewal of the controversy was occasioned by a demand for an increase in wages of 10 cents per hour. This demand being refused, the employees went out on strike. Joint conferences were arranged by the conciliator, which lasted three days. A plan for the classification of the workers in the packing plant was agreed to by the joint conference, and the company agreed to pay the average rates paid by the six packing companies in the vicinity of Waterloo and also pay a bonus of \$2 to all the employees. This proposal necessitated a special meeting of the entire organization of the workers, at which it was voted to accept the proposal. A new general agreement was drawn up, covering wages and working conditions, which was signed by the company officials, representatives of the workers, and the conciliator. The employees returned to work Monday, May 12.

Machinists, Niagara Falls, N. Y., Tonawanda, N. Y., and Bradford, Pa.—In December, 1918, the Industrial Relations Division of the War Department requested the Department of Labor to assume jurisdiction in the machinists' controversies in the cities named above. The Industrial Relations Division of the War Department had been successful in keeping the machinists at work, but upon the signing of the armistice this service ceased to function, and the dispute automatically came to the Department of Labor for disposition. Commissioner Joseph R. Buchanan was delegated by the Department to work out an amicable adjustment. In this case the machinists were demanding the "Buffalo award," i. e., the scale of wages which had been put into effect in the city of Buffalo and to which industrial concerns engaged on Government orders had subscribed. The slackening demand for the output of these shops, incidental to the cancellation of war contracts since the signing of the armistice, had strengthened the determination of the employers to resist all further demands. This stand of the employers had incensed the men, who maintained that they had been tricked, inasmuch as they had remained at work at the request of the Government upon the assumption that their demands would receive recognition. Nearly 10,000 men were employed in the shops affected.

Commissioner Buchanan conferred with representatives of the men and urged that owing to the unsettled conditions prevailing they should not press their claim for increased wages, but should endeavor to secure a reduction in the number of hours worked per day, in order that a larger percentage of the workers could remain

at work pending the general slackness in trade. In these efforts he was successful. The matter was then taken up with the employers in a number of conferences and finally at a joint meeting of the Employers' Association of Niagara Falls and the chamber of commerce of that city the following resolution was adopted:

Whereas the manufacturers of Niagara Falls realize that there is likely to be unemployment during the period of readjustment from war to peace basis; and

Whereas the United States Department of Labor has requested the manufacturers in the interest of industry in the community during this period of readjustment to agree that the hours of labor in the factories will, where practicable, be cut down in lieu of making a reduction in the force: Therefore be it

Resolved, That we are willing and anxious to cooperate in any measure to reduce unemployment and we hereby adopt the said request of the United States Department of Labor.

No action on the proposition was officially taken by the employers of Tonawanda and Bradford, but the individual employers in those cities expressed sympathy with the action taken at Niagara Falls. In view of this resolution the employees were generally disposed to waive their demand for the adoption of the "Buffalo award," and a disposition was soon evidenced by both sides to wait until such time as a change in the industrial situation should warrant some other course.

Bakersfield & Kern Electric Railway Co.—On March 14 the Bakersfield & Kern Electric Railway Co. requested the good offices of Commissioner Charles T. Connell in adjusting a controversy which had arisen between that company and its employees at Bakersfield, Calif. The employees were platform men, and were members of the Amalgamated Association of Street & Electric Railway Employees of America, Local No. 869. The employees were demanding recognition of the union, an increase in wages, and better working conditions. Commissioner Connell suggested a modification of these demands in lieu of the fact that the National War Labor Board in its awards had consistently refused to allow recognition of the union where such recognition had not prevailed previous to the war-time period. On April 5 the local voted to strike as soon as it received the sanction of the international union. The commissioner immediately got in touch with the employees and urged that no precipitate action be taken pending further negotiations. In this he was successful. After a number of conferences in which the questions in dispute were vigorously discussed the men finally agreed to waive their claim for recognition. A joint conference was then arranged at which were present three union men, three nonunion men, three representatives of the company, and the commissioner. Every effort was made to obtain some sort of concession from the company in the nature of an increase of wages, but the result was unsatisfactory and a strike again threatened.

An international officer of the union appeared at this time and by his moderation and sense of fairness assisted materially in avoiding an open break. The company finally agreed that at some time subsequent to July 1 the question of additional compensation for the men would be given very careful consideration, and that if possible some advance would be made. This proposition was accepted by the employees and the threatened strike was averted.

Building trades, Memphis, Tenn.—On April 2 the secretary of the Memphis Builders' Exchange, Memphis, Tenn., wired the Department that the journeymen painters of that city had gone on strike after making excessive demands which had been turned down by the exchange. It was stated that arbitration had been refused by the painters but insisted upon by the employers association. The assignment of a commissioner of conciliation was requested. Commissioner William C. Liller was detailed to the case.

It soon developed that the painters were but one of several crafts involved in the controversy. The carpenters, plumbers and steam fitters, and paper hangers and decorators had also made demands which had been refused in part by the contractors. Conferences were held in an effort to arrive at a satisfactory conclusion. The old agreements were used as a basis of settlement and efforts to amend them to the satisfaction of both sides proved difficult. The manner of reaching an adjustment, however, finally proved successful and new agreements were signed to be effective until April 1, 1920.

Georgia Railway & Power Co., Atlanta, Ga.—On July 15, 1918, the Georgia Railway & Power Co. wired the National War Labor Board, stating that the employees of that company who were affiliated with the Amalgamated Association of Street & Electric Railway Employees of America had called a strike to be effective on the morning of the 16th of July, and that such a strike would undoubtedly result in complete cessation of street, suburban, and interurban traffic, including service to Camps Gordon, Fort McPherson, and Jessup. The War Labor Board referred the case to the Division of Conciliation for disposition and Commissioner of Conciliation J. W. Bridwell was immediately assigned and instructed to prevent a strike if possible.

The company had previously operated under nonunion conditions, but in compliance with the program as enunciated by the National War Labor Board it had recognized the right of its employees to organize into trade-unions and to bargain collectively through chosen representatives. The company maintained that in spite of this recognition the union employees had called a strike without notice or warning. Commissioner Bridwell worked energetically to prevent the inauguration of the strike, but the men nevertheless ceased work on the morning of the 16th. A strike had occurred on the lines

of this company in 1916, which after a long struggle had been lost by the men. They now demanded the reinstatement of the men who had been discharged at that time. However, after almost continuous conferences the men finally agreed to waive all demands except that for recognition of their union, and they stated that such recognition need not necessarily mean a closed shop. Both sides seemed anxious for a settlement and concessions were graciously made by both sides and an agreement reached which brought the strike to a close.

Cleveland building trades.—On May 2 the Building Trades Council of Cleveland, Ohio, wired the Department claiming a violation of the agreement existing between the Building Employers' Association of Cleveland and the various crafts constituting the building trades. The agreement mentioned had expired on May 1, and had by mutual consent been extended to May 6. The various crafts had remained at work pending an adjustment of their claims, except the electrical fixture workers who had ceased work on May 1. Acting upon the advice of the commissioner, A. L. Faulkner, the joint conciliation board agreed that negotiations between all trade committees should be resumed, and May 15 was set as the time limit for adjustment in all trades. If agreements could not be reached by that time, the disputes were to automatically revert to the conciliation board.

The magnitude of the controversy may be seen from the fact that 25,000 men were directly affected. Probably one-half as many more would also be involved if a strike were called. It was finally agreed to refer the questions in dispute to a board of arbitration. Each side then elected an arbitrator and these two agreed upon Commissioner Faulkner as the third man. The decision of the arbitration board granted the following award: Bricklayers, masons, and plasterers, \$1 per hour, effective May 29, ending April 30, 1920; electrical fixture workers, 80 cents per hour beginning May 1, 1919, and ending May 1, 1920, and 87½ cents per hour for the succeeding year; electrical workers, \$1 per hour, effective July 1, 1919, terminating May 1, 1920 (this was an increase of 10 cents per hour); carpenters, 85 cents per hour, effective May 1, 1919, with an additional increase of 5 cents per hour effective October 1, 1919. The adjustment of the building trades dispute in Cleveland was hailed with great satisfaction by both sides, and enabled business operations in that city to proceed uninterruptedly.

Nordyke & Marmon Co., Indianapolis, Ind.—A case of peculiar interest was brought to the attention of the Department on December 16, 1918, by Mr. L. C. Schwarts, business agent of the machinists' union at Indianapolis, Ind. It was alleged by Mr. Schwarts that the Nordyke & Marmon Co. had threatened to blacklist a number of

female employees who had recently left the employ of the company. Commissioner John J. Walsh was assigned to look into the matter and prevent, if possible, any serious consequences. This plant employed fully 4,000 workers and was engaged largely on Government contracts. It appeared that the difficulties arose through a misunderstanding which caused a number of female employees to tender their resignations. These employees were then advised by a tactless foreman that they would be blacklisted and would be unable to secure employment in Indianapolis. When this rumor spread to the large body of employees of the plant it caused murmurs of disapproval and dissatisfaction which threatened to become serious. Commissioner Walsh promptly got in touch with the general manager, who promised that under no circumstances would any employees be blacklisted or discriminated against in any way, and that he would gladly furnish recommendations to employees leaving the service of the company, and that letters of merit would be presented the female employees who had patriotically responded to the needs of the Government. The situation was then explained to the employees of the plant, who expressed their satisfaction at the outcome.

Dubuque Boat & Boiler Co., Dubuque, Iowa.—A case of alleged discrimination against a union employee threatened to bring about a strike at the plant of the Dubuque Boat & Boiler Co., located at Dubuque, Iowa. The matter was brought to the attention of the Department on May 3, 1919, by Mr. L. H. Bathurst, representing the boiler makers. Commissioner L. R. Thomas was detailed by the Department. Upon Mr. Thomas's arrival at the seat of the trouble he found that the employees of the plant, in addition to making a charge of discrimination, were also demanding recognition of a union committee and requesting adoption by the company of the scale of wages put into effect by the United States Shipping Board for the Great Lakes and Atlantic coast regions. The company positively denied the charge of discrimination, expressed a willingness to meet with committees of its employees, and agreed to submit the wage question, jointly with its employees, to the National War Labor Board for a decision. This proposal was agreeable to the employees and the difficulties seemed satisfactorily disposed of. The matter of presenting the matter to the board was then taken up, but by the time the data had been prepared the board had ceased to function. The men then to the number of 175 went out on strike. Commissioner W. H. Rodgers, who was then in the vicinity of Dubuque, was assigned to the case. He conferred with both sides concerned and then arranged a joint conference at which a settlement satisfactory to all concerned was finally negotiated. The men returned to work and a much better feeling was engendered. This company was engaged on the construction of barges for the Government.

Building trades, Sharon, Pa.—On May 14, the Department was requested by Mr. Bascess, of the Sharon Building Co., Sharon, Pa., to assist in adjusting a strike of carpenters and other building craftsmen which was interfering with the building operations at Sharon and vicinity. Commissioner of Conciliation James A. Smyth was selected to take up the matter. About a thousand men were involved in the dispute. Commissioner Smyth at once arranged for conferences at which the matters in dispute might be discussed. The carpenters had been on strike since April 1 for increased wages and better working conditions. They were demanding \$1 per hour for journeymen carpenters and a corresponding increase for helpers and less-skilled workmen. The old rate had been 70 cents per hour. After a number of conferences, the contractors were finally prevailed upon to grant an increase of 10 cents per hour. This increase, while not entirely satisfactory to the men, was finally accepted by them and building operations were resumed on May 26.

Steacy-Schmidt Manufacturing Co., York, Pa.—Lodge No. 243, International Association of Machinists, York, Pa., requested the assistance of the Department in adjusting a controversy which had arisen at York, between the Steacy-Schmidt Manufacturing Co. and its machinists. Commissioner L. R. Thomas was assigned by the Department on September 20, 1918. This controversy was brought about by the alleged discharge of an employee for union activities. About 400 men were involved. Mr. Thomas called at the office of the company and secured the reinstatement of the discharged employee, which satisfactorily disposed of the controversy and brought about much better relations between the company and its employees.

Building trades, tri-cities.—A controversy affecting the operations of the United States Housing Corporation in the tri-cities of Rock Island and Moline, Ill., and Davenport, Iowa, was reported on November 7, 1918. Commissioner G. Y. Harry was assigned to the matter. About 2,000 men were involved, including carpenters, electrical workers, painters, bricklayers, sheet-metal workers, plumbers, and steamfitters. A joint conference was arranged and an agreement drawn up which contained a plan of procedure for taking care of all grievances then existing or which might come up thereafter. The following rates of compensation were agreed upon to be in effect for a period of six months. Plumbers and steamfitters, 80 cents per hour; carpenters, 75 cents per hour; bricklayers, 81½ cents per hour; electrical workers, 70 cents per hour; painters, 70 cents per hour; sheet-metal workers, 75 cents per hour. This agreement satisfactorily disposed of the controversy and enabled the housing corporation to proceed uninterruptedly with its program.

Textile workers, Passaic, N. J.—On February 18, 1919, the Department was advised of a serious textile strike at Passaic, N. J. Commissioners James L. Hughes and Charles J. Fury were assigned by the Department to take up the matter. About 15,000 workers were found to be on strike. The demands were for a 44-hour week with the same pay as they were then receiving for 55 hours, which would amount, approximately, to a 35 per cent increase. The strikers were also asking recognition of the union known as the Independent Union of General Workers of the Textile Industries. The strike had been pending for a number of weeks and various conciliatory efforts by the mayor and other local officials had been unsuccessful. Commissioners Hughes and Fury put forth every possible effort to bring the strike to an end, but all efforts were unsuccessful until March 21, when an adjustment was brought about. The settlement was reached through the decision of both sides to submit the wage scale to Commissioner Fury for decision, all other questions having been previously adjusted.

Mahoning & Shenango Railway & Light Co.—The linemen employed by the Mahoning & Shenango Railway & Light Co. of Youngstown, Ohio, who had been working under a contract which expired on March 31, on the termination of the agreement, struck. The linemen, under the contract, had been receiving an hourly wage of 53½ cents and working a nine-hour day. On October 15, because of changed conditions, the hourly wage had been increased to 65 cents, which rate continued until March 31. Prior to the expiration of the contract, the men had demanded 95 cents per hour for the same day. This demand the company rejected, with the above-mentioned result. The company appealed to the Department of Labor for assistance. Mr. W. D. Davidge, commissioner of conciliation, was assigned to the case and reached Youngstown on the 12th. After a series of negotiations with the employer and employees, he succeeded in arriving at an agreement between them, under which the wages and other conditions should be submitted to an arbitrator to be appointed by the Secretary of Labor, the award of the arbitrator to be binding upon both parties.

In the meantime, at the request of Mr. Davidge, the company agreed, pending the appointment and decision of an arbitrator, to increase wages from 65 to 80 cents per hour, this appearing to him, under all the conditions and circumstances, to be a reasonable rate for the work to be performed. The arbitrator subsequently established the wage which the commissioner of conciliation suggested. On the execution of the agreement to arbitrate the men returned to work.

Pittsburgh Street Railway Co.—A strike of the street car men of Pittsburgh, Pa., in August, 1919, brought about an entire suspension of operations in that great industrial center. Commissioner Charles P. Howard was assigned on behalf of the Department. Upon his arrival at Pittsburgh, Mr. Howard found that a strike had existed two weeks and various unsuccessful efforts had been made to bring about a resumption of operations. The Pittsburgh Railway Co. was in the hands of receivers. The National War Labor Board had already handed down a decision in this case. The court recommended that the award of the board should be submitted to the State court, with the recommendation of the receivers that they be empowered to carry out its terms. The demand of the employees was for an increase of 12 cents per hour to bring the maximum rate to 60 cents, this being the rate paid in Detroit, Cleveland, and other cities of similar size. The award of the National War Labor Board was for a 12 per cent increase, which by adding fractions as directed, gave practically a 6-cent per hour increase instead of the 12 cents asked for. The employees had refused this proffered advance as being inadequate and had gone on strike for their original demands. All appeals to the strikers to return to work failed and an order from their international officers was ignored. The attempts to operate the cars with strike breakers were unsuccessful. Some damage to property had resulted and several arrests of strikers had been made upon warrants charging violation of the order of the court. A suit for damages in a large sum had also been filed against the Amalgamated Association of Street and Electric Railway Employees of America for breach of contract. Vice Presidents Fitzgerald, Reardon, and McGrath of the association conferred with the receivers for the purpose of agreeing upon terms upon which the strikers could return to work. Terms were finally arranged by which all men should be reinstated in their old positions with seniority rates restored. The men who had been arrested were to take their old places until such time as they should be proved guilty. Strike breakers who had been imported into the city were to be returned to the places from which they came as soon as practicable, no attempt being made by the receivers to operate cars until every opportunity had been given the strikers to return to work. A secret ballot was taken to decide the issue. After all possible pressure had been brought to bear upon the strikers a vote upon the proposal to return to work was taken and resulted as follows: In favor of ending the strike, 2,082; against, 408.

British Ministry of Food in the United States v. Chicago Egg Inspectors' Union.—A case of peculiar and unusual interest arose at Chicago affecting the supply of food under contract for the British

Government. It appears that a contract had been given for the candling and shipping of eggs to the Davies company, of Chicago. This company was alleged by the Chicago Egg Inspectors' Union to be employers of nonunion labor, mostly Negro girls. The union threatened to suspend all work being done for the British Government unless the Davies company were compelled to employ union help. Commissioner Oscar F. Nelson was assigned to the case on October 24, 1918. Mr. Nelson conferred with the British official representative and from him learned the situation. The contracts in Chicago were for an enormous shipment of eggs for the hospitals in France. Delay of any kind was serious, as arrangements for the shipping of the eggs had been made. A conference was arranged between the British representative, Mr. Horrocks, Mr. P. F. Donlan, business agent of the egg inspectors' union, and Commissioner Nelson. It was learned that the Davies company had sublet their contract to an egg broker who had had trouble with the union in the past; that he had employed Negro girls at wages decidedly less than the union scale; and that he had advertised his intention of teaching these girls the egg-candling business for the purpose of breaking up the egg inspectors' union. Such announcement had aroused the union and caused them to threaten strike.

As the Chicago Egg Inspectors' Union is a Federal labor union affiliated with the American Federation of Labor, Commissioner Nelson called into the conference Mr. John Fitzpatrick, president of the Chicago Federation of Labor, and invoked his good offices in bringing about an understanding. An agreement was finally drawn up and signed by Mr. Horrocks, Mr. P. F. Davies, representing the Davies company, John Fitzpatrick, president of the Chicago Federation of Labor, and Commissioner Nelson. This agreement provided that the egg inspectors' union agree to supply egg inspectors sufficient in number to do the work—which was approximately $2\frac{1}{2}$ to 3 cars per day, 500 cases per car, packed for export. It was further understood that the British Government would take up the matter of either having the company employ the members of the egg inspectors' union or secure cancellation of the Davies company's contract. These arrangements were to be consummated within 10 days.

Restaurant and theater employees, Washington, D. C.—During the period of the war, the various recurrent controversies between the waiters' union and the Washington hotels were handled to the satisfaction of all parties by Commissioner of Conciliation Rowland B. Mahany. He also adjusted all disputes during this time between the street railway companies and their employees. Mr. Mahany likewise brought about industrial peace between the theatrical managers and the men employed in the Washington theaters. Periodica

controversies between the bakers' union and the different baking establishments of Washington arose from time to time, and these difficulties, too, were composed in a satisfactory manner by Commissioner Mahany. These were all cases of first importance, a great number of minor ones being brought to the same happy conclusion. So that during the war period no city in the United States was freer from industrial unrest than the Capital City of the Nation.

Meat packing industry in Chicago; agreement between the packing houses of Chicago and their employees.—On April 12, 1919, the Secretary of Labor was notified by the presidents of five large packing-house plants in Chicago that they were willing to continue the agreement existing during war time for one year after the declaration of peace. The agreement mentioned was the one executed by the President's Mediation Commission, of which Secretary Wilson was chairman, in the winter of 1917-18, under the terms of which certain wages and conditions were agreed upon and Samuel Alschuler, of Illinois, judge of the Circuit Court of Appeals, was named as administrator.

The proposal for a continuance of the agreement was submitted to the representatives of the various crafts employed in the packing-house industry of Chicago and by them taken up for consideration with the workers. The workers, through their representatives, submitted a counter proposal providing for a continuation for one year after the declaration of peace, with some suggested changes as to methods of rehiring former employees, hearing grievances in the first instance, etc.

The Secretary of Labor selected Col. J. L. Spangler, of Pennsylvania and Ernest P. Marsh, of the State of Washington, members of the President's Mediation Commission, and Hugh L. Kerwin, director of conciliation, as his personal representatives, to proceed to Chicago and endeavor to harmonize the differences in order to continue the existing conditions in the packing industry. The representatives of the Department held conferences in Chicago for several days with the presidents of the packing houses and their representatives, and with the president of the Amalgamated Association of Meat Cutters and the representatives of the other crafts involved in the packing-house industry, and finally worked out a plan which was satisfactory to both sides. Approximately 50,000 workers are involved under this agreement. This result marks a new era in peace time in one of the most important industries in the country, and it is felt that the effect of this plan will be far-reaching.

Among the most important elements contributing toward the newer and better relationships in this industry has been the great service rendered by Judge Alschuler. There has not been a decision of his

that has not been religiously lived up to by both sides, and not a single thing has occurred during the entire period of his administration which has held up production in any of the packing houses in Chicago. It should be borne in mind that this plan completed to-day will carry with it not only a continuation during the period of one year after the declaration of peace of the present arrangements with the 5 big packers, but that 15 other packing plants in Chicago will come under the same arrangement.

Summary.—During the fiscal year the Department of Labor has assigned commissioners of conciliation to 1,780 cases, made up of 587 strikes, 1,113 disputes and threatened strikes, 63 lockouts, and 47 walkouts. Of these it has succeeded in adjusting 1,223, not including 219 referred to the National War Labor Board. In only 111 instances have the commissioners failed to make settlements. Thirteen cases are still pending. The number of disputes and the disposition of each is shown in the following tables, together with a summary by months, a record of the action taken in cases pending at the time of the last annual report, and a statement of the geographical distribution of cases as reported by months.

RECAPITULATION.

Month.	Strikes.	Dis- putes and threat- ened strikes.	Lock- outs.	Walk- outs.	Ad- justed.	Unable to adjust.	Un- classi- fied.	Pend- ing.	Re- ferred to Na- tional War Labor Board.	Total.
July.....	69	112	3	1	131	3	23	.....	28	185
August.....	88	179	6	2	178	4	43	.....	50	275
September.....	46	163	9	2	147	4	34	.....	55	240
October.....	54	187	8	5	151	7	33	.....	63	254
November.....	35	96	2	3	102	13	11	.....	10	136
December.....	29	92	3	1	81	19	18	.....	7	125
January.....	43	65	4	.....	79	11	17	.....	5	112
February.....	37	36	3	.....	57	4	15	.....	.....	76
March.....	25	54	4	1	72	8	3	1	.....	84
April.....	59	34	6	1	78	13	7	1	1	100
May.....	64	38	13	1	86	18	7	5	.....	116
June.....	38	37	2	.....	61	7	3	6	.....	77
Total.....	587	1,113	63	17	1,223	111	214	13	219	1,780

¹ Commissioner not having judicial power to enforce compliance with his conclusions, could only report result of his conferences to representatives of employees.

² All demands granted except that of closed shop.

Cases pending at end of fiscal year, 1918.

Character:	
Strikes.....	2
Disputes and threatened strikes.....	5
Total.....	7
Disposition:	
Adjusted.....	4
Unable to adjust.....	1
Unclassified.....	2
Total.....	7

Cases reported from each State for each month.

State.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	Total.
Alaska.....	1												1
Alabama.....	2	3	1		1	2	6		2	4			21
Arizona.....			1								1	1	3
Arkansas.....		1		1									2
California.....	5	9	14	8	3	4	2	2	4	7	3	1	62
Colorado.....		2	5	1	2	1					1		12
Connecticut.....			3	4			1	1					9
Delaware.....	1	1	3	2		1		1		1	1		11
District of Columbia.....	2	2	10			1	1		14			1	32
Florida.....			3			1	1	2	1	1	3		12
Georgia.....	7	2		1	2	3		6	3	1	2		27
Idaho.....		3	1	2				1	1			1	9
Illinois.....	15	21	15	24	10	10	8	6	5	10	14	15	153
Indiana.....	18	27	17	20	15	23	8	7	12	3	3	9	162
Iowa.....	5	2	2	5	1	2	1	2	4	2	3	3	32
Kansas.....	3	5	2	2	1	1		3		1		1	19
Kentucky.....	1	11	4	3	2		1	1	2	1	1		27
Louisiana.....		1	2				4			1			8
Maine.....			1		1	1	1	1				2	7
Maryland.....	2	8		3	2	1	3	1	1	1			23
Massachusetts.....	13	7	5	12	8	7	4	2			5	3	66
Michigan.....	3	12	7	7	6	2	4			2			43
Minnesota.....	3	6	4	4	3	1				3		3	28
Mississippi.....				2	1						1	1	5
Missouri.....	4	6	3	4	8	3	5	2	1	6	2	3	47
Montana.....	2	1	6	1	2		1		1		1		15
Nebraska.....			1	1	1	1			1				4
Nevada.....	2												2
New Hampshire.....				1									8
New Jersey.....	6	2	2	12	2	3	5	2	6	6	4	2	51
New York.....	19	16	26	33	24	14	10	4	6	7	1	4	162
North Carolina.....	2	1	1						1	2		1	4
North Dakota.....							1				2		3
Ohio.....	21	41	30	30	11	7	5	5	7	8	16	9	190
Oklahoma.....	1	3		2		3			1	3	6	1	20
Oregon.....				1	1						1		2
Pennsylvania.....	18	26	39	35	11	13	15	12	5	6	18	7	205
Porto Rico.....				1					1		1		3
Rhode Island.....	5	3	1	1	1	1							12
South Carolina.....			1	1									2
Tennessee.....		2	2	6	1		1	1	3	8		2	26
Texas.....	1	11	4	2	5	10	3	3	1	2	6	2	50
Utah.....	4		2	4	1		1				2		14
Vermont.....		1	2					3					3
Virginia.....	3	1	1	1	2	3	3				2	1	20
Washington.....	1	6	4	1	1		7	2		1		2	25
West Virginia.....	5	8	2	2			2			3	1	1	24
Wisconsin.....	7	22	12	12	7	4	6	6	2	8	12	1	99
Wyoming.....	1		1	1									3
Interstate.....	2	1	1		1	1	2			2	2		12
Total.....	185	275	240	254	136	125	112	76	84	100	116	77	1,780

WAR LABOR ADMINISTRATION.**NATIONAL WAR LABOR BOARD.**

Origin and functions.—The National War Labor Board was created as a part of the War Labor Administration, and was the first of the organizations set up under the program outlined by the Advisory Council to the Secretary during the previous fiscal year. Among the things considered as vitally necessary at the beginning of the year 1918 was a treaty of peace between capital and labor. In order to arrive at some understanding for the term of the war, I called together representatives of each group. For this purpose I had requested the National Industrial Conference Board and the American Federation of Labor as the principal representatives of employers and wage earners, respectively, to send five persons each to a war

labor conference. Since it was recognized that it might be a matter of some difficulty to choose a chairman acceptable to both groups, each group was invited to choose a chairman who should preside on alternate days. Under this arrangement Hon. William Howard Taft, ex-President of the United States, and Hon. Frank P. Walsh, former chairman of the Industrial Relations Commission, were chosen.

The result of the conference was the establishment of a series of guiding principles which are now well known to the public and are set forth at length in my last annual report. For the purpose of making a concrete application of those principles in specific cases, it was recommended by the War Labor Conference Board that there be created a National War Labor Board to adjust labor disputes in industries manufacturing materials necessary to the conduct of the war. The same persons who had constituted the War Labor Conference Board were invited by me to become members of the National War Labor Board. This action was formally approved and confirmed by presidential proclamation on April 8, 1918. The original membership of the board was as follows: ¹ William Howard Taft, joint chairman and public representative of employers; Frank P. Walsh, joint chairman and public representative of employees. For employers: L. F. Loree, W. H. Van Dervoort, C. Edwin Michael, Loyall A. Osborne, B. L. Worden. For employees: Frank J. Hayes, William L. Hutcheson, William H. Johnston, Victor A. Olander, Thomas A. Rickert.

It was the intention of the President as expressed in the proclamation confirming the action of the Secretary of Labor to set up a board which should have broad and elastic powers and which might function as a sort of supreme court of industry. The exact intent of the President's proclamation is set forth in the following excerpt:

The powers, functions, and duties of the National War Labor Board shall be to settle by mediation and conciliation controversies arising between employers and workers in fields of production necessary for the effective conduct of the war, or in other fields

¹ The following appointments and changes in personnel have taken place: Thomas J. Savage to be alternate for Mr. Johnston; T. M. Guerin to be alternate for Mr. Hutcheson, May 13, 1918; F. C. Hood to be alternate for Mr. Loree, May 17, 1918; C. A. Crocker to be alternate for Mr. Worden, June 1, 1918; F. C. Hood to become principal on the resignation of Mr. Loree, June 1, 1918; John F. Perkins to be alternate for Mr. Osborne, June 1, 1918; Frederick N. Judson to be vice chairman and alternate for Mr. Taft, June 18, 1918; John F. Perkins to be alternate for Mr. Hood, June 27, 1918; H. H. Rice to be alternate for Mr. Van Dervoort, July 1, 1918; Wm. Harmon Black, to be vice chairman and alternate for Mr. Walsh, July 20, 1918; Matthew Woll to be alternate for Mr. Olander, July 24, 1918; John J. Manning to be alternate for Mr. Rickert, July 24, 1918; J. W. Marsh to be alternate for Mr. Michael, Sept. 1, 1918; on Oct. 9, 1918, the board was notified of the death of Thomas J. Savage; Fred Hewitt to be alternate for Mr. Johnston, Oct. 22, 1918; F. C. Hood resigned as member of the board on Nov. 19, 1918; P. F. Sullivan to be alternate for Mr. Osborne, Dec. 3, 1918; Frank P. Walsh, joint chairman, resigned as a member of the board on Dec. 3, 1918; Wm. Harmon Black, vice chairman and alternate for Mr. Walsh, resigned as a member of the board on Dec. 3, 1918; Basil M. Manly to be joint chairman, to fill the vacancy caused by the resignation of Mr. Walsh, Dec. 4, 1918; Wm. Harmon Black to be vice chairman and alternate for Mr. Manly, Dec. 4, 1918; John F. Perkins, alternate for Mr. Hood, to be a principal, to fill the vacancy caused by the resignation of Mr. Hood, Dec. 4, 1918; B. L. Worden resigned as a member of the board on Dec. 9, 1918; C. A. Crocker, to be a principal, to fill the vacancy caused by the resignation of Mr. Worden, Dec. 11, 1918; Harold O. Smith to be alternate for Mr. Crocker, Jan. 17, 1919; Granville E. Foss to be alternate for Mr. Perkins, Feb. 11, 1919; C. A. Crocker resigned as a member of the board on Feb. 24, 1919.

of national activity, delays and obstructions in which might, in the opinion of the National Board, affect detrimentally such production; to provide, by direct appointment or otherwise, for committees or boards to sit in various parts of the country where controversies arise and secure settlement by local mediation and conciliation; and to summon the parties to controversies for hearing and action by the National Board in event of failure to secure settlement by mediation and conciliation.

The principles to be observed and the methods to be followed by the National Board in exercising such powers and functions and performing such duties shall be those specified in the said report of the War Labor Conference Board dated March 29, 1918.

It was understood, however, that the establishment of this board was never intended to abridge in any way the normal work of conciliation and mediation by the Department. There could necessarily be no conflict, because the theories upon which the two were founded differed widely. The functions of the conciliator are essentially diplomatic in nature. He never acts as a judge or arbitrator. The essence of his service lies in the fact that he acts as a friend to both sides. His efforts are devoted wholly to securing voluntary agreements. In any controversy it must be recognized that the best result will spring from a self-imposed settlement. However admirable judicial procedure may be, the imposition of an arbitrary award by even a disinterested person acting as judge or arbitrator is not ideal for the settlement of disputes, although it is necessary where the parties to the disputes are themselves unable to adjust their difficulties. Hence the Conciliation Division devotes itself wholly to the settlement of cases by diplomatic instead of judicial methods.

In sharp contrast to this method was that of the National War Labor Board. Reference of a dispute to it was a presumptive indication that conciliatory methods had failed. Unlike the Division of Conciliation, it was not presumed to be a friend to both sides, except in the sense of being impartial. It was essentially judicial in its judgment of the cases and had the public interest solely in view.

Disposition of cases.—From April 30, 1918, to May 31, 1919, the board received 1,270 cases, 25 of which were consolidated with other cases, leaving 1,245 separate controversies which had to be passed upon by the board. Of these 1,245 cases, 706 (57 per cent) were referred to other agencies having primary jurisdiction or dismissed because of voluntary settlement, lack of jurisdiction, or for other reasons; 77 (6 per cent) are pending or remain on the docket as undisposed of because of divided vote or suspension; while in the remaining 462 cases (37 per cent) awards or findings have been handed down. In addition the board made 58 supplementary decisions in cases where action had already been taken, making a total of 520 formal awards or findings. This record within a period of less than 13 months is one which unquestionably has never been approached by any similar agency in the history of industry.

An analysis of the disposition of the 1,245 cases referred to is given in the following table:

Statement showing disposition of cases before the National War Labor Board to May 31, 1919.

Complaints received:

Joint submissions.....	193
Ex parte.....	1,052
Total.....	1,245

Disposition of cases:

Awards and findings made.....	1 462
Dismissed.....	391
Referred.....	315
Pending.....	23
Remaining on docket because board was unable to agree.....	2 53
Suspended.....	1
Total.....	1,245

As to the 315 cases which were received by the board and referred to other boards and agencies having original jurisdiction, the following table shows the number referred to each specified agency:

Number of cases referred to each specified agency.

Department of Labor, Division of Conciliation.....	164
Department of Labor, Employment Service.....	1
Railroad Administration, Division of Labor.....	13
Navy Department.....	6
Treasury Department.....	1
Post Office Department.....	8
Emergency Fleet Corporation, Industrial Relations Division.....	4
Emergency Fleet Corporation, Labor Adjustment Board.....	6
War Industries Board.....	3
War Labor Policies Board.....	1
Fuel Administration.....	6
Federal Oil Inspection Board.....	1
War Department, various divisions.....	24
War Department, Quartermaster General.....	8
Army Ordnance, Industrial Relations Section.....	29
Signal Corps and Aircraft Production Board.....	20
Board members.....	10
Officers of international unions.....	10
Total.....	315

It will be seen from the foregoing analysis that more than one-half of the complaints referred were sent to the Division of Conciliation of the Department of Labor with the object in view of having the differences adjusted, if possible, without recourse to formal proceedings before the board.

¹ Not including 58 supplementary awards, etc., in cases in which action had already been taken.

² These 53 cases represent actually only 3 case-groups, as one of the case-groups involves 51 docket numbers.

Of the cases removed from the docket of the board without action by formal award or finding, the greater number were dismissed without prejudice because of lack of prosecution or because the board was advised that the parties involved had entered into a formal agreement and no further action by the board was necessary. The following table shows in detail the number of cases removed for each reason specified:

Cases removed from docket for reasons specified.

Lack of jurisdiction.....	93
Lack of agreement.....	11
Lack of prosecution.....	159
Voluntary settlement between parties.....	116
Withdrawal.....	12
Total.....	391

It should be noted that cases removed from the docket required in many instances as careful consideration by the board or its staff as those cases in which formal awards or findings were made.

Analysis of the work of the board by months, May, 1918, to May, 1919.—An interesting insight into the volume of work which might have been developed by the board had not the armistice been signed is set forth in the following table, which furnishes a review of the work of the board by months during the 13 months ended May 31, 1919:

Month.	Cases placed on docket.			Awards and findings made.				
	Joint submissions.	Ex parte.	Total.	Industrial.	Public utilities.	Total.	Supplementary actions.	Total actions.
May to July.....	38	208	246	13	21	34	-----	34
August.....	29	96	125	4	-----	4	-----	4
September.....	39	180	219	8	-----	8	2	10
October.....	18	133	151	14	12	26	3	29
November.....	24	251	275	17	21	38	3	41
December.....	13	55	68	17	8	25	9	34
January.....	9	78	87	43	12	55	10	65
February.....	3	70	73	35	12	47	6	53
March.....	15	1	16	114	7	121	11	132
April.....	1	4	5	79	9	88	11	99
May.....	4	1	5	15	1	16	3	19
Total.....	193	¹ 1, 077	¹ 1, 270	359	103	462	58	520

¹ Including 25 docket numbers consolidated.

The rapid expansion of the work of the board during the period of actual hostilities is at once apparent from an examination of the foregoing table. At the time of the signing of the armistice the board had acted on 455 cases but had made only about 72 formal awards and findings, due to the fact that special attention had been given to important cases involving the production of large quantities of munitions, ordnance, and essential war materials. After the signing of the armistice a resolution of the board provided that no new cases except

joint submissions would be received by the board after December 5, 1918. Altogether there have been received during the six months since the armistice only 423 new cases, as compared with 847 cases entered on the docket during the six months prior to the armistice. During the six-month period since the armistice the board has acted on the 375 cases which were pending when the armistice was signed as well as approximately 400 new cases which have been docketed.

Executive sessions of the board.—During the summer of 1918 and up to the time of the signing of the armistice in November of the same year an executive session of the full board or its standing committee was held each week. The usual practice was for the standing committee to meet one week and the full board the following week, although the pressure of work at times was so great as to require the full board to remain in session continuously for a longer period than a week. Altogether 104 days were devoted to executive meetings by the board during the year. This does not include the considerable periods which the board spent in conducting public hearings. As almost all the members had other important duties to perform, the policy was adopted of each member appointing an alternate to represent him when his presence was required elsewhere, so that the adjustment of important matters before the board might not be delayed.

Scope of board's awards.—A careful tabulation of the data in the files shows that up to May 22 the awards and findings of the board (excluding 11 for which the information is lacking) directly affected 1,084 establishments employing 669,496 persons, of whom 80,271 were employees of street railways. These numbers, it is to be emphasized, include only those persons who were specified directly in the terms of the decisions. In very many cases the decision was applied in practice to other employees of a plant than those in whose names the controversy was filed.

. Of still more importance is the fact that very frequently a decision in regard to one company was accepted by other companies similarly situated. The information on this point is very limited, but it is known that in very many instances controversies were settled voluntarily or by other adjustment agencies on the lines laid down by existing decisions of the board. Thus it is known that the decision of the board in the Bridgeport case was accepted and applied in the plants of the Remington Arms Co. in other places; and that the street railway decisions have been the basis of voluntary adjustment in Philadelphia, Washington, and many other cities.

Indeed the "principles" of the National War Labor Board as laid down by the Conference Board and as interpreted by the War Labor Board had a vastly wider influence and acceptance than indicated by any mere numerical statement of the persons directly

affected by the decisions of the board. Other governmental adjustment agencies—such as the Industrial Service Section of the Ordnance and other branches of the War Department, as well as the labor adjustment divisions and boards of other procurement divisions of the Government—have used these principles and precedents as a manual in their own adjustment work. Moreover, the conciliators of the Department of Labor, whose work during the war has been of far-reaching importance, averted many difficulties by citing the principles and precedents of the board to the parties in controversy and working out an adjustment thereunder.

Of special interest, also, is the large number of strikes and lockouts averted or called off as a direct result of the board's intervention. The exact number is unknown, but the records show at least 138 instances of this character.

Origin of cases.—The proclamation of the President creating the National War Labor Board conferred upon it jurisdiction in all controversies "in fields of production necessary for the effective conduct of the war, or in other fields of national activity, delays and obstructions in which might, in the opinion of the National Board, affect detrimentally such production."

The jurisdiction, as regards subject matter, thus conferred upon the board was extremely broad, inasmuch as in the reorganization of industry on a war basis there existed very few business activities which did not affect, directly or indirectly, the effective conduct of the war. This is indicated by the fact that the board dismissed fewer than 50 complaints on the ground that war production was not involved.

In practice, however, the jurisdiction of the board was greatly and desirably limited by the further provision of the proclamation that the board should refuse to take cognizance of a controversy "in any field of industrial or other activity where there is by agreement or Federal law a means of settlement which has not been invoked."

This provision excluded from the consideration of the board, except by way of appeal, large groups of cases where the parties concerned had provided by voluntary agreement for other means of arbitration or where Federal law had provided other arbitration agencies. Thus the vast shipbuilding industry had set up by agreement its own labor-adjustment board; the Ordnance Department and other producing departments of the Government had provided special industrial service sections to consider the complaints of their employees; and the coal-mining industry had its labor conditions controlled by agreement of all parties with the Fuel Administration. In this way, in a number of the most important industries, means of adjustment of disputes had been arranged for, and controversies therein could reach the board only on appeal. The procedure of the board provided, more-

over, that appeals would be heard only on the ground that the principles of the President's proclamation had been violated, or that either party to an award had violated it, or to determine questions of jurisdiction as between Government boards. In no case was an appeal permissible on question of fact.

The cases which came to the board on appeal from decisions of other boards were very few. Perhaps the most important of these was the New York Harbor case, which came up on appeal from the New York Harbor Wage Adjustment Board.

A very large number of cases, however, came to the board by way of reference from conciliation agencies—such as the Department of Labor—which had been unable to adjust the matters in controversy. Thus of the 462 cases in which the board made awards and findings almost exactly one-third came by way of reference from other agencies and two-thirds by way of direct complaint to the board. Most of the cases coming by reference were from the Department of Labor, but some of the most important were referred by the War and Navy Departments and had been previously handled by the Industrial Service Sections of these departments. Such were the St. Louis cases, the Bridgeport cases, the Worthington Pump case, the Smith & Wesson case, and the Newark (N. J.) machinists' cases.

It is also of interest to note that of the complaints brought directly to the National War Labor Board about 12 per cent were made by employers or employers' associations; the remainder were made either by groups of employees or, in the case of union shops, by their union representatives.

Execution of awards.—The board was given no legal authority to enforce its decisions. In case of joint submission the parties had, of course, the right of legal redress as in all cases of violation of contract. Otherwise the execution of the board's decisions depended on the support of public opinion, the support of other governmental agencies, and the obligation laid upon employers and employees by their chosen representatives in the formation of the board and the drafting of its principles.

Particularly during the period of active hostilities the powers of the procurement departments of the Government—such as the War and Navy Departments—were very great, and these powers, as well as the influence of the President himself, were consistently used in support of the awards of this board. The most striking cases of this kind were the Bridgeport and Smith & Wesson cases. In the former the President told the striking employees he would use the Federal Employment Service and other branches of the Government to their disadvantage if they did not accept the board's award. In the Smith & Wesson case the War Department immediately took over the plant of that company when it refused to abide by the board's decision.

The outstanding fact, however, is that, as long as active war was on, the decisions of the board were accepted almost without exception both in ex parte cases and in cases of joint submission. Since the armistice, and more particularly since the first of the year, the changed industrial conditions, the questioning in some quarters as to the board's authority in the intermediate period between the armistice and the proclamation of peace, and the uncertainty in some minds as to the continued existence of the board, have combined to create a condition when the board's decisions have been less spontaneously accepted.

Hearings by board and examiners.—When the number of submissions to the board became so great as to render hearings by examiners necessary, such hearings almost entirely supplanted hearings before board members. In addition to the heavy requirement of considering the testimony secured by examiners the board heard only cases of peculiar difficulty or listened to oral argument in cases in which the testimony had previously been submitted to examiners. In total there have been 488 hearings held by the board members and by examiners, hearings by examiners being 321, or 66 per cent of the total.

The hearings were distributed as follows:

Hearings held before—

Umpires.....	20
Full National War Labor Board.....	59
Recess or standing committee.....	6
Joint chairmen.....	46
Joint chairmen and section.....	2
Double section.....	1
Board and section.....	1
Sections.....	32
Examiners.....	321
Total.....	488

During the months of greatest activity examiners' hearings averaged about 15 per week, and in view of the length of many hearings and their wide separation geographically, this involved the need of some 30 examiners. Usually the hearings were held at the place of controversy. This was done primarily for reasons of economy, as it was much less expensive to send an examiner with necessary assistants to another point than it was to pay the expenses of representatives and witnesses to Washington. The policy adopted was to assign only one examiner to a hearing, except in cases of particular difficulty or complexity; but this policy could not always be observed, owing to the need of breaking in new examiners, a process which could be best accomplished by sending a new man with a more experienced examiner, in order that he might get practical training.

Special field representatives.—At the outset of the board's work it was thought that beneficial results might be obtained by having representatives, designated by the employers' and employees' groups, make preliminary investigations of complaints which were brought before the board. It was expected that these special field representatives might be successful in mediating or adjusting differences, or could prepare special reports as to the facts involved for the consideration of the board. Later these special field representatives were instructed to assist the parties to a controversy in preparing their cases for hearings. This procedure, while sound in theory, did not work out satisfactorily in actual practice, for the reason that it tended to extend or accentuate the original differences as to which complaints were made. As a consequence, in the procedure as finally adopted by the board the use of special field representatives was discontinued.

Administration of awards.—The policy of the board has been always to encourage to the greatest possible extent the self-administration of its decisions. In practice, however, even the best drawn awards almost always left room for divergent interpretations. If the differences were small, adjustment could be made by correspondence, but in case of major differences the sending of an examiner as an interpreter and administrator proved to be the only alternative to having the parties bring their difficulties direct to the board. The demand for such service was particularly acute in cases where an award provided for collective bargaining in a plant where collective bargaining had not previously existed. Often the parties in such cases were completely at a loss as to how to begin such a system and imperatively needed counsel with some one familiar with the processes of installing shop-committee systems.

A large number of awards specifically provided that an examiner—or administrator, as he came to be called—should be sent to interpret the award. In addition, a great number of requests for administrators have been received in cases where the award did not specifically provide for the sending of an administrator or where such action was contingent upon a request made by one or both parties. The number of administrators available has never been sufficient to meet all of the requests made. Moreover, the demand for the services of administrators has steadily increased as more and more decisions were rendered by the board, and at present there is a greater demand for such services than at any previous time.

In total, 180 awards and findings have been administered by the Department of Administration of Awards. Administrators have been present in person in 128 cases. The maximum number of administrators at the time of greatest activity was about 25.

The administration of the street railway awards was susceptible of a high degree of standardization. They had a common authorship—all of them were written by the joint chairmen; they related to a single industry of remarkably homogeneous character; and, usually, the employees were highly organized and both parties had been accustomed to collective bargaining.

The industrial awards, on the other hand, presented a bewildering variety of conditions, and have, in many cases, necessitated the installation of elaborate machinery for collective bargaining. A notable instance of this is the Bridgeport case, where over 60 establishments, employing 60,000 persons, were involved. It is of much interest to note that the system of department and works committees established under this award has been accepted by both parties as a permanent institution.

Another striking item in the history of the administrative work was the statement of officials of the Corn Products Refining Co. (Docket No. 130) to the administrator of the board, that the expense of the award to the company, amounting to a million dollars or more, was more than compensated for by the improved classification of occupations worked out by the board and its examiners and by the greater security of industrial relations secured by the award.

Organization of staff.—One of the most burdensome duties was that of organizing a staff. In the first place, there was the difficulty of securing capable assistants at a time when the pressure on the board for prompt action was greatest and when the man power of the country was in greatest demand for war purposes. More than balancing this, however, was the fact that the work offered in the service of the board was of a character to attract men of the highest grade.

A second and even more important difficulty was the uncertainty as to the character and amount of work which was to be intrusted to the staff. For the more or less routine duties—such as the Files and Docket, Buildings and Supplies, and Auditing Divisions—the work could be forecast with more or less accuracy, but the work of the judicial and administrative examiners—which in time became the most characteristic and important branch of the staff organization—was a matter of development and could not be anticipated at all fully. Thus at the start of its work it was the evident intention of the board, itself or by sections, to hear the parties to each controversy submitted to it. The rapid accumulation of cases submitted, however, soon made such a course physically impossible, and the policy was then adopted of employing a staff of judicial examiners who might take the testimony of parties for digesting and presentation to the board. This use of examiners, however, grew up slowly, through requests of the board and its sections in individual cases, and it was not until some two and a half months after the board's organization that defi-

nite authority was given the secretary of the board to handle controversies in this manner.

Similarly, the provision of administrators to interpret the board's decisions grew out of the necessities of the moment. The award in the Waynesboro machinists' case was the first recognition of the principle that the board in making an award retained jurisdiction and might assume the duties of helping both parties to put the award into effect. Slowly this became the accepted practice of the board, and as a result the need arose for a staff of special administrative examiners to aid the parties in interpreting and applying awards.

The maximum number of employees on the staff of the board was approximately 250. This point was reached immediately before the signing of the armistice.

Special reports and archives.—Prior to the dissolution of the board detailed reports from the departments of the organization were prepared as follows:

1. Department of Procedure.
 - (a) Division of Complaints.
 - (b) Docket Division.
 - (c) Division of Public Hearings.
 - (d) Official Reporting.
2. Files and Information.
 - (a) Files Division.
 - (b) Editorial Division.
 - (c) Publications Division.
3. Department of Examinations.
 - (a) Division of Investigation.
 - (b) Division of Analysis.
 - (c) Cost-of-Living Division.
4. Administration of Awards.
5. Department of Office Management.
6. Department of Auditing and Accounts.

Three special reports have also been prepared which are likely to be of historical and scientific value. They are as follows:

1. Report on the administration of awards, by Erville B. Woods.
2. The work of the public utilities division, by Charlton Ogburn.
3. Analysis of the awards and findings of the board, by Robert P. Reeder.

The awards, findings, orders, or actions of the board in all cases which have come before it also have been collected and arranged according to docket numbers and in bound form.

Discontinuance of the board.—The National War Labor Board, having been created as part of the war machinery, passed out of existence with the termination of the fiscal year. Its service had covered a term of barely 14 months, only one-half of which was within the

period of active hostilities. During that period the board developed by the force of circumstances into a supreme court of industry. As to its success in such a rôle there can be no reasonable doubt. Over and over again it demonstrated its effectiveness in adjusting industrial disputes and thereby securing maximum production, when such disputes menaced the success of the war. By the nature of its organization and the character of the principles followed it almost invariably was able to secure adjustment on a basis of right and justice that appealed as such to the judgment of all fair-minded men.

DIVISION OF NEGRO ECONOMICS.

Origin and functions.—In previous years the attention of the Department had been repeatedly called to specific labor problems involving race relations. Perplexing questions frequently arose with regard to Negroes in industry. With the greater industrial efficiency demanded by the war a more harmonious adjustment of the labor relations between whites and Negroes was imperative, especially in view of the fact that the latter race makes up over one-tenth of our total population and includes about one-sixth of the working population. It has long been the policy of the Department to avail itself of the best expert knowledge obtainable with reference to its problems. Hence a Negro adviser to the Secretary of Labor was appointed as Director of Negro Economics. His function is to advise the Secretary on matters affecting Negro wage earners and to outline and direct plans toward greater production. This step was taken not only because the advice of an expert was necessary but because it was felt that a race which made up such a large share of our industrial army and had contributed so generously to our military and naval forces was certainly entitled to a seat at the Secretary's council table when matters affecting its interests were considered. The work of this division since its establishment has amply justified its creation, and my policy has been to refer to it for advice concerning the administration of all problems peculiar to Negroes as wage earners.

Method of organization.—The administration of the work of this division has had for its basic idea the view that repressive measures are inadvisable and that the interests of the races are best promoted where cooperative relations exist between white and colored leaders. The Director of Negro Economics consequently promoted the organization of cooperative committees of white and colored citizens in the States and localities where labor problems existed. The nature of such work made a field force necessary, and a staff of State supervisors of Negro economics was intrusted with the local administration of such policies as were formulated. Since many of these policies related to the employment functions of the Department the supervi-

sors necessarily worked in cooperation with the field staff of the United States Employment Service.

The utility of the plan outlined and carried out during the war proved to be of equal value in many of the reconstruction questions involving white and colored wage earners and their relations to white employers which have arisen since the signing of the armistice.

Questions of race relations will probably affect and modify labor problems for an indefinite period. The combination of white and colored citizens as volunteers on local Negro workers' advisory committees, cooperating and advising together, and with the officials of the Department of Labor, may be regarded as a most desirable means of securing the largest results in applying to local problems the wider experiences, policies, standards, and needs of the Nation.

The two races are thrown together in their daily work. The majority of the employers and a large number of fellow employees of Negro workers are white persons. This condition gives rise to misunderstandings, prejudices, antagonisms, fears, and suspicions which must be removed by mutual understanding and cooperation. Therefore the plan and program of the Department as carried out in this matter has been based upon the principle of cooperation of white employers, Negro workers, and, wherever possible, white workers.

Conferences and field organization.—Prior to my last annual report, State Negro workers' advisory committees, made up of representative Negroes and cooperating white citizens, had been appointed in Florida, Georgia, Mississippi, North Carolina, Ohio, Virginia, and Kentucky. Following State conferences of white and colored citizens, committees were formed in Illinois, Michigan, and New Jersey. A State conference was held in Missouri, and local committees were formed in Pennsylvania without holding a State conference. County and city committees were appointed in 10 States, making in all about 225 local committees. The State supervisors of Negro economics and the special agents working in cooperation with the United States Employment Service were continued in 10 States.

The good feeling and understanding developed through these conferences and local and State committees were widespread in their effect; so much so that on February 17 and 18, 1919, I called an informal conference of 45 welfare boards, agencies, and organizations dealing with Negro life. White and colored representatives to the number of 151 responded to the call and recommended to the Department a line of procedure and a plan of work for increasing the efficiency and opportunities of Negro wage earners and for improving their relations to white workmen and white employers.

Report on Negro migration in 1916-17.—The investigation of Negro migration, undertaken under the direction of Dr. James H. Dillard, of Charlottesville, Va., as mentioned in my last annual report, has

been printed and published. More than 2,000 copies have already been put into the hands of interested citizens throughout the United States. Copies have been placed in all the principal libraries, and from many persons in all parts of the country have come high words of commendation of the timeliness and value of the report. A valuable investigation of the experience of the Negro in industry was also begun through the Investigation and Inspection Service. Much material was gathered, but from lack of funds it has not been completed.

Samples of work accomplished.—(1) The United States Employment Service of the Department has necessarily received the largest amount of assistance, North and South, in connection with the recruiting and placement of Negro wage earners. The Federal State directors of that service in 10 States depended for advice and assistance almost entirely upon the field staff of the Division of Negro Economics on practically all matters relating to Negro labor. In Virginia and Alabama special assistance was given in developing the Boys' Working Reserve among Negro boys.

(2) The Woman in Industry Service, the Investigation and Inspection Service, the Children's Bureau, the Conciliation Service, the Bureau of Industrial Housing and Transportation, and other branches of the Department were served in a cooperative way in their dealing with Negro wage earners.

(3) Educational and efficiency campaigns were carried on throughout the territory to inform Negroes of the relation of their work to the winning of the war and the necessity for 100 per cent production. These campaigns gave stimulation also to amicable relations between white and colored workers and white employers. This work was carried on through mass meetings and audiences in churches, lodges, and welfare societies, and by means of posters, publicity to all the Negro newspapers, etc. Shop talks on the Nation's needs, race pride, promptness, regularity, full-time work and increased opportunities for large earnings have been given. Employers gladly arranged hours for such talks and commended the efforts.

(4) Advice was given to employers on matters of sanitation in industrial towns and camps. Employers were appealed to on the ground that proper conditions produce greater regularity, stability, and contentment among Negro workers.

(5) Through consultation with State and city officials and with those leading in labor distribution, the superior effectiveness of publicity and persuasion over against compulsory measures as a means of securing efficient work was shown. For instance, in Norfolk, Va., a labor shortage committee proposed to have a drive to compel men to go to work or go to jail. Through the advice of the local Negro workers' advisory committee a plan for a 10-day educational cam-

paign to appeal to the Negro laborers was substituted for the work-or-jail plan. The result was more Negro applicants for the work than were needed at that time, and this became a basis for the further stimulation of Negro labor.

(6) Such methods of stimulation reduced the labor turnover and absenteeism in a number of plants as shown by statements of many employers.

(7) The promotion of stability and thrift among Negro wage earners may be illustrated by the effect of the "own-your-own home" effort in Ohio. The supervisor of Negro economics gathered information about the laws and operations of building and loan associations and sent out information to the Negroes throughout the State. The result, in four months, was a series of extension lectures in three cities to Negroes by one of the universities, the establishment of three well-organized Negro building and loan associations in three cities, and plans for five others in as many different cities of the State. The effect of this work on the communities, and especially on the Negro workers, has been far-reaching, according to the testimony of both white and colored citizens.

WAR LABOR POLICIES BOARD.

Origin and functions.—Among the war problems of the Department was that of regulating the relations of services and bureaus in the Departments of Labor with similar services and bureaus in other departments. In the fixing of wages and working conditions, for instance, adjustment boards and agencies existed in practically every production branch of the Government. The work of these agencies was frequently in conflict, and it was highly desirable that their policies be unified and that the boards themselves work in harmonious relations with one another. Nor were such conflicts of authority confined to the adjustment of labor disputes. There were incompatibilities with regard to the supervision of working conditions, housing, and many other functions of the Department of Labor. As a means of bringing these agencies into mutual relationships, there was created by the Secretary of Labor a War Labor Policies Board, composed of the chiefs of the various bureaus and services of the Department, together with representatives of the other production departments of the Government.

The board was established on May 13, 1918, with Mr. Felix Frankfurter, Assistant to the Secretary of Labor, as chairman. Its first meeting was held on May 29, 1918. The departments, boards, and administrations represented besides the Department of Labor were the War Department, the Navy Department, the Department of Agriculture, the United States Shipping Board, the Emergency

Fleet Corporation, the Fuel Administration, the Food Administration, the Railroad Administration, and the War Industries Board. In addition to members representing these branches of the administration, the Policies Board had advisers representing organized labor and other experts and technicians who qualified in business management and other technical fields.

The need for the War Labor Policies Board arose from the fact that the Federal Government had become the greatest employer in the country. And although the Government represented one people and might therefore be expected to have a single broad policy toward labor, the first year of the war had brought out many diverse policies from that single Government. The inevitable result was that the National Government, operating through different agencies, was saying and doing irreconcilable things. Each of the labor policies announced by each of the branches of the administration could not be right, because many of them were mutually contradictory.

The function of the board was to reconcile such differences so far as they referred to administration of labor matters and to recommend to the Secretary unified labor policies to harmonize the industrial activities of separate branches of the Government. It was well adapted to this end, since—although it was created by the Secretary of Labor and operated under his direction—it included responsible representatives of other branches of the Government.

Elimination of labor turnover.—The chief problem to be faced was the wastage which arose from labor turnover. This evil was magnified by competitive recruiting on the part of persons employed by or operating on behalf of the Government. Private labor agencies and private businesses were also insistently seeking the labor needed for vital war work. To eliminate this waste and to assure a sufficient number of workers for war purposes the board recommended the policy of central recruiting of unskilled labor through the United States Employment Service. With the approval of the Secretary of Labor and by presidential announcement this policy was put into effect on August 1. Plans were also made for the recruiting of skilled labor similarly, but they never became operative by reason of the armistice.

Adoption of uniform standards.—Diversity in the conditions and standards of employment in the different governmental agencies were a second cause of industrial disturbances and of labor turnover resulting in a decrease in output. To harmonize such diversities the board devised and recommended clauses for insertion in the contracts executed by the war production departments. These clauses dealt with the questions of child labor, contract labor, the Federal eight-hour laws, the enforcement of State laws, and the submission of labor disputes to arbitration.

For the enforcement of such of these provisions as related to labor standards the cooperation of State labor bureaus was secured. These State agencies were authorized to enforce the contract provisions by the Federal departments responsible for the execution of contracts. In order to obtain a satisfactory understanding with State organizations a conference was held on September 30 and October 1, at which 34 States were represented.

Industrial exemptions.—The War Labor Policies Board also developed and recommended to the provost marshal general a system of furloughing skilled laborers in order to minimize the disorganizing effects of the draft upon essential industries. Another plan, providing district draft boards with industrial and agricultural advisers, was designed by the board and also adopted by the provost marshal general. In accordance with this plan exemptions for industrial needs were determined on the basis of national rather than local requirements.

The rapid growth of many communities due to the establishment of war industries produced living conditions which made it impossible for workers to maintain their efficiency. To correct these evils the War Labor Policies Board recommended that the Department of Labor establish a Commission on Living Conditions of War Workers, the duties of which were to cooperate with governmental departments and local agencies in securing proper living conditions for workers in war industries. The recommendation was approved by the Secretary of Labor, and a commission of five members was appointed October 16 as a part of the Bureau of Industrial Housing and Transportation.

Wage stabilization.—One of the chief obstacles to the proper distribution of labor had been the variations in wages paid by different contractors for the Government. These differences were frequently of considerable magnitude, even within the same city and for the same trades. This resulted in a tremendous turnover of labor which seriously interfered with productive efficiency. It was the individualistic strike. It represented the individual workman dissatisfied with conditions who was either unwilling or unable to enlist his fellow workman in a collective protest. It was much larger in the aggregate than all of our strikes. Something had to be done to reduce it to a minimum if our war-industry effectiveness was to be maintained. It was apparent that only some system of standardization of wage rates would accomplish the desired results.

Every collective wage agreement entered into between employers and employees establishes standard wages for the period of its existence and to that extent has a stabilizing effect. It reduces unrest to a minimum because employers and employees are alike parties to the agreement. Any policy of standardization determined upon by the Government to reach its effectiveness had to give to the

employer and employee a voice in determining the wage standards that were to be introduced. This policy was pursued in the creation of the various wage-adjustment boards. These did not cover all of the field except in the case of the National War Labor Board, and in that case jurisdiction did not begin until the spirit of unrest amongst the workers had reached the stage of creating a labor dispute. Standardization with a view to preventing the unrest was never undertaken in the general field of industry. In order to cover that neglected field, the board perfected plans for the formation of a Building Trades Board and a Metal Trades Board, composed of representatives of employers, employees, and the Government, to deal with problems that arose outside the jurisdiction of the Shipbuilding Adjustment Board and the Railroad Board of Wages and Working Conditions. Plans were being worked out for the creation of additional boards in other essential industries when the signing of the armistice eliminated the need for further action.

Profiteering.—Directly related to the question of wage stabilization is the problem of the steadily increasing cost of living. The Department realized that to regulate wages without at the same time meeting the question of the rising costs of the services and materials which the worker purchases with his wages would be dealing in half measures. Accordingly the question of price control was referred to the War Industries Board, the Food Administration, and the Department of Agriculture, with the request that they proceed as rapidly as possible with the formulation and enforcement of plans for the increase of production and the stabilization of the prices of the necessities of life and the elimination of profiteering through the equitable limitations of profits.

Employment of women.—The reduction in the available labor supply due to the draft resulted in a steady increase in the employment of women. The Department has held the protection of women against the hazards resulting from their entry into industry of prime importance. A statement of the policy of the Government with regard to the employment of women was adopted which included principles to be observed in occupations employing women and the safeguards which should be provided for them. Since administration of this policy has been assigned to the Woman in Industry Service by the Secretary of Labor, a detailed description of the principles included within that policy are set forth in that part of this report which describes the operation of the latter service.

Plant surveys.—Realizing that the scientific utilization of industrial plants was the first requisite in securing maximum production, the board devised a plan for surveys to be made by the community labor boards of the Employment Service, under the direction of the War Industries Board, to ascertain the extent to which plants capable of being utilized for war production were being employed and

to devise means for the conversion to war uses of plants now fitted only for production of nonessentials.

These are some of the more important matters which have been dealt with by the War Labor Policies Board. Other problems affecting one or more branches of the Government found their way to this board for reference. To them all this board brought the light which arose from common counsel of separate agencies working on the single task of exerting the full energies of the Nation in the prosecution of the war.

Abolition of the board.—The contingency which brought the War Labor Policies Board into existence was the divergence of policy in labor matters brought about by the creation of large numbers of Government agencies to deal with labor. With the cessation of hostilities the greater part of the agencies mentioned also ceased, and with their disappearance there ceased to be any necessity for a centralizing agency. Consequently the jurisdiction of the War Labor Policies Board rapidly dwindled. Before the end of the fiscal year it was possible to discontinue the entire staff. Although the necessity for reconciliation of interdepartmental conflicts had passed the function of course remained of reconciling differences between branches of the Department. This function, however, is sufficiently provided for by the normal organization of the Department and by the Departmental Cabinet (q.v.). The Policies Board was therefore discontinued in March, 1919.

WOMAN IN INDUSTRY SERVICE.

Origin and functions.—The Woman in Industry Service¹ was organized in July, 1918, a year and three months after the entrance of the United States into the war. It is charged with the duty of developing standards and policies to insure the effective employment of women while conserving their health and welfare. It was instructed to keep in close touch with the other divisions of the Department of Labor, each of which has a relation to women in industry, and to coordinate such work in other Federal departments. It is expected to work with State departments of labor. Its aim is to unite in the active carrying out of a consistent and rounded program by all the agencies which touch various phases of the problem of women wage earners. It was confronted at once by the problems involved in a rapidly increasing reliance upon the work of women as a reserve labor force in the face of the withdrawal of men for military service at the rate of a quarter of a million a month. It was clear that for the sake of production the Federal Government must pro-

¹ At the beginning of the fiscal year 1920 the title of the Woman in Industry Service was changed to the "Women's Bureau."

vide not only for the recruiting of women workers but for the safeguarding of the health and efficiency of these women who were meeting the requirements of new and unaccustomed tasks.

This rapid increase in the employment of women constituted a peculiar war problem. Fundamentally, however, the purpose of the Department of Labor in its relation to women in industry is identical in peace and in war. With all the changes brought by the war the organic act creating the Department is still applicable: "The purpose of the Department of Labor shall be to foster, promote, and develop the welfare of the wage earners of the United States, to improve their working conditions, and to advance their opportunities for profitable employment." The difference during the war was the wider public recognition of the necessity for "advancing the opportunities" of women "for profitable employment."

Thus, while the problems of women in industry during the war differed in form from similar problems in time of peace, the fundamental tasks were so much alike that the experience gained in dealing with them during the war may be regarded as a basis for action in time of peace. A report of the activities and plans of the Woman in Industry Service in the four months which elapsed between its establishment and the signing of the armistice should, therefore, be not merely a history but an introduction to a program for the work of the Federal Government on behalf of women wage earners in the period of readjustment and thereafter. Therefore, logically the record divides into two parts, the first describing the period of the war and the second setting forth the problems of the eight months after the armistice was signed.

ACTIVITIES DURING THE WAR, JULY 16 TO NOVEMBER 11, 1918.

When the Secretary of Labor recommended to Congress an appropriation for a special service for women in industry, he outlined its purpose and functions as follows:

It is undoubtedly true that the Department of Labor exercises all of its powers with reference to wage earners of both sexes and of all ages. It is also true that the best administration requires that the various services of the Department which are here outlined be conducted by including within the work of each service all questions regarding women as well as men.

But the great importance of the employment of women in most essential war work and the development of special matters of policy with respect to such employment make it important to establish a special service devoted to the subject of women in industry.

In view of the fact that the other services will, as above indicated, include within their sphere women as well as men, this special service of women in industry is not large; will be largely policy making and administrative in character rather than itself executive; but will maintain close contact with all the work of the Department on this special subject and will also coordinate and control such work in all other departments.

Stated more specifically the purpose of this service is:

1. To consider all general policies with respect to women in industry and to advise the Secretary of Labor as to the policies which should be pursued.
2. To keep informed of the work of the several divisions of the Department in so far as they relate to women in industry and to advise with the divisions on all such work.
3. To secure information on all matters relating to women in industry and to collate such information into useful form.
4. To establish useful connections with all governmental departments and divisions on this subject and with voluntary agencies and societies.

In announcing on July 9, 1918, the appointment of the director and assistant director, the Secretary further stated the purposes of the Woman in Industry Service as follows:

In recognition of the great importance to the Nation of the work of women in industry and the urgent necessity for a national policy in determining the conditions of their employment, I have urged and Congress has now granted, the necessary authority to establish a Women's Division in the Department of Labor. Its immediate task will be to develop in the industries of the country, policies and methods which will result in the most effective use of women's services in production for the war, while at the same time preventing their employment under injurious conditions. Its large and very necessary aim will be to focus attention on the national importance of the conditions of women's work as influencing industrial standards and as affecting the welfare of the entire Nation.

The Women's Division will be charged primarily with determining policies rather than carrying on detailed administration. Because of this policy-making function of the Women's Division, its director will serve as a member of the War Labor Policies Board. It will coordinate work for women in other divisions of the Department of Labor and in industrial service sections of other departments of the Federal Government. It will cooperate with State departments of labor, working with and through them, in order to bring about united action by the States in national problems of women's work. The Women's Division will concern itself primarily with war conditions but will be mindful of the need for observing and interpreting the tendencies in women's employment which are likely to have permanent social effects.

The Women's Division has been established in response to needs widely felt by all, men as well as women, who are conscious of the increasing share women must have in the industrial activities of the war. The problems of women in industry are so manifold and complex that a clearing house of thought and leadership is needed in the National Government. The Women's Division has been established to give this leadership.

Council on Women in Industry.—To accomplish the task of coordinating the efforts of all Federal agencies concerned in women's work the service was authorized by the Secretary of Labor to organize the Council on Women in Industry, composed of women representing every division of the Department of Labor and other Federal departments having organized work related to problems of women in industry. Its membership included the Women's Branch of the Ordnance Department, the Women's Section of the Railroad Administration, the Federal Board for Vocational Education, the Committee on Woman in Industry of the Advisory Commission, and the Woman's Committee of the Council of National Defense, and from the Department of Labor representatives of the services

concerned with investigation and inspection, training and dilution, information and education, and working conditions, the United States Employment Service, the Immigration Bureau, the Children's Bureau, the Bureau of Naturalization, the Bureau of Labor Statistics, the United States Housing Corporation, the War Labor Board, and the War Labor Policies Board. The council did not assume any executive or administrative functions nor did it have any authority over the programs of its members. It was a forum for discussion of the important questions coming before the Woman in Industry Service and the other groups cooperating with it. Among the subjects for discussion have been the safeguards to be established in new occupations, the enforcement of State labor laws, the regulation of night work under war conditions, the application of the principle of equal pay for equal work, and the recruiting and training of women workers. The cooperation which will be described in the succeeding report of activities of the Woman in Industry Service was materially furthered by the weekly meetings of the council.

Recruiting women for new occupations.—It has already been indicated that the outstanding question concerning women in industry which grew daily more important during the war was the necessity of greatly increasing the proportion of women in the essential industries of the country in order to meet the demands of production and at the same time to release men for military service. There was great danger of hysterical campaigns which would stimulate the recruiting of women without giving assurance that their services would become effective for production or that proper safeguards for women workers should be established. It was difficult for those unfamiliar with the difficulties of introducing a new and untrained personnel into industry to appreciate the care which must be taken to avoid actual decrease in production by rapid and careless methods of filling positions. Nor could those who had not been familiar with the efforts of years to build up standards for protection of the health of the workers appreciate how important were the maintenance and extension of those standards during the war. The situation was made more critical by the fact that companies whose policy toward their men workers had never won their confidences and cooperation were likely to arouse the suspicion that the war emergency would be used as an excuse for employing women at lower rates of pay and under conditions which would weaken any control gained by the workers through collective bargaining.

The following program was proposed by the Woman in Industry Service:

1. Standards governing the employment of women in industry should be authoritatively issued after adoption by the War Labor Policies Board, with the twofold purpose of controlling conditions especially in new occupations for women and also serving as a guide in the selection of occupations in which the employment of women might be increased. That is to say, instead of offering a list of occupations in which

women should be substituted for men, the Federal Government would promulgate standards, together with the statement that in any occupation in which these standards were upheld the extension of the employment of women would be desirable, at the same time calling attention to the necessity for greatly increasing the employment of women under these conditions.

2. Certain broad statements could be made about occupations in which it would be desirable to employ women, but these must always be in the nature of information rather than authoritative rulings, since local conditions would make a recommendation for the employment of women unwise in one locality and wise in another, where both the nature of the process and the conditions surrounding it were different.

3. Certain occupations which had been proved to be more injurious to women than to men should be listed as a group from which women should be excluded.

4. Instead of attempting to formulate a detailed program for the country as a whole, the War Industries Board and the United States Employment Service would be asked to name those localities in which the shortage of labor was most acute. The various Federal agencies concerned with investigation, training, placement, health, and working conditions would then be asked to concentrate their efforts in those localities in order to solve the problems there and also to give a foundation from experience for an increasingly adequate program of labor distribution throughout the country.

5. Inquiries into certain typical occupations should be pushed forward rapidly by the Woman in Industry Service with a view to making definite recommendation regarding changes in the process and the establishment of conditions which had been proved most effective in the experience of establishments employing women.

6. Meanwhile plans should be formulated for exhibits of women's work and other forms of educational presentation of facts which should result in enlisting the services of women in the war industries, while winning also the cooperation of industry in establishing the conditions which should make for the largest production over a long period.

It is possible to record progress in each section of this program, although the signing of the armistice made it unnecessary to introduce women in such large numbers in this country as in Great Britain or France, and the program as a whole was therefore not carried out. The action taken is set forth in subsequent pages of this report.

Standards governing the employment of women in industry.—A tentative draft of standards which should govern the employment of women in industry was presented to the Secretary of Labor October 10, 1918, adopted on October 18, and modified on October 25, in the light of the probability that an armistice would soon be signed. Before it was recommended to the Secretary of Labor it had been submitted for criticism and suggestions to every State department of labor, to representative employers, and to working women representing national and international trade-unions having women members. In formulating the standards consideration was given to experience in industry during the war, to regulations already established in State labor laws, and to such statements by Federal agencies during the war as General Orders No. 13 issued by the Chief of Ordnance and simultaneously by the Quartermaster General as recommendations to arsenal commanders and to manufacturers working on contracts for the War Department. The report of the National

War Labor Conference Board, which constituted the principles to guide industrial relations during the war, was also used as a basis.

It was decided by the production departments of the Government to insert in the contracts the most important provisions of those standards, especially those relating to daily and weekly hours of labor, and the principle of equal pay for equal work. With the signing of the armistice and the consequent curtailment of contracts this plan was not carried out. After some revision to meet peace conditions (consisting chiefly of the elimination of certain clauses permitting a working day as long as 10 hours when the necessities of war might require it), the standards were finally issued on December 12, 1918, as the basis for a program of reconstruction.¹

They were widely distributed through State departments of labor, and through organizations working to improve conditions of employment for women. The Employment Service brought them forcibly to the attention of all field offices. The interest which they aroused showed how widespread was the need for a statement of common purposes toward the attainment of which energies could be directed with assurance of support through united action.

Hazardous occupations.—Shortage of labor was first felt in those occupations in which working conditions were hazardous or disagreeable and there was serious danger, therefore, that women would be introduced first into occupations involving hazards to their health. To meet this problem a series of inquiries was planned, to discover the occupations in which women might be safely employed and the practical measures needed to remove all hazards not inherent in the essential nature of the process. To direct this work the Woman in Industry Service organized the committee on hazardous occupations, composed of representatives of the Surgeon General's office, the Ordnance Bureau, and the Chemical Warfare Service of the War Department; the Navy; the United States Public Health Service; the National Research Council; the Bureau of Standards of the Department of Commerce; the War Industries Board; the Working Conditions Service; the Bureau of Labor Statistics and the Woman in Industry Service of the Department of Labor.

The first place selected for a survey was Niagara Falls, where the chemical industries were of great importance as basic in the war industries. Two representatives of the Industrial Commission of New York State were added to the committee for this survey, to insure cooperation in putting into effect the detailed recommendations for dust removal, sanitation and safety, and other precautions against occupational hazards. These recommendations were worked out in practical detail by physicians, engineers, and women investigators acting for the committee.

¹A copy of the Standards will be found on pp. 142-143.

Certain general principles emerged from this survey. The first was that in some communities war conditions were merely accentuating labor shortage due not merely to the withdrawal of men for military service but to conditions of employment which were an obstacle in production before the war, less clearly recognized when workers were less free to choose.

The second fundamental principle was that unhealthful conditions were generally bad, not only for women but for men also. This, however, could not be held as an excuse for failure to correct those conditions before women should be introduced. For the sake of the productive efficiency of the industry employers should be discouraged from employing women until they were willing to apply the measures long known to be necessary as safeguards for health of men also in the hazardous occupations.

Although many industrial poisons are equally dangerous for women and men, lead poisoning, which is the most prevalent of them all, has for women and the race more disastrous consequences than for men. This is because lead is a race poison. The woman who has suffered from it is likely to be sterile, or to have miscarriages, or to lose her babies in the first year of life. These facts were emphasized by the investigation at Niagara Falls, which showed that a plant there manufacturing storage batteries had already employed women and might increase their numbers. In this occupation, and in this alone, did the Woman in Industry Service urge that no woman be employed anywhere or under any conditions in a process in which she would be exposed to lead poisoning. In all other forms of employment the Woman in Industry Service recommended not the exclusion of women but such changes in conditions as would make the occupation healthful for them. If practical difficulties stood in the way of these changes, it was held that the employment of women should be postponed as long as possible, under such conditions, for example, as exposure to dust or extremes of temperature, or the necessity for lifting or carrying heavy weights. In the industries of Niagara Falls so many changes would have been necessary that it was urged that women should not be employed in the chemical industries there until they should be made safe.

The general policy, however, was a recognition of the practicability of greatly decreasing the burdens of hand labor for men or women by using mechanical devices, and of affording safeguards against the risks of poisoning by removing fumes and dusts at their source, and by strengthening the individual's power of resistance through medical supervision, and through hours of work short enough to protect health.

The problem of night work.—The immediate reason for the investigation of the chemical industries was a request to the Department,

asking that the Federal Government should make it possible for the employers in war industries in Niagara Falls to disregard the New York State law, which prohibits the employment of women in factories at night. This was but one of many similar requests which came with increasing frequency during the summer and early autumn of 1918. Following the organization of the Woman in Industry Service all such appeals which reached the office of the Secretary of War were referred to the service for review. The Woman in Industry Service in turn considered these cases in cooperation with the various industrial-service sections of the other Federal departments, especially the Woman's Branch of the Ordnance Department, which made the initial investigation in the majority of plants making this request.

In the complicated problems which these instances illustrated there was presented the necessity for working out a program which should protect the health of the women at work and reenforce standards already set in the labor laws of the States and at the same time speed up production. No problem which the Woman in Industry Service was called upon to solve was more difficult than this. Before a wise program could be developed, it was necessary to study in the concrete case the importance of women's work in the production of the plant, to know the needs of the Government for that particular product, and to consult those organizations, especially those of the workers themselves, which had been responsible for legislation to protect women against night work in some of the most important manufacturing States.

Twelve States—Connecticut, Delaware, Indiana, Kansas, Massachusetts, Nebraska, New York, Oregon, Pennsylvania, South Carolina, Utah, and Wisconsin—had laws which prohibited the employment of women or girls, or both, in factories during the night hours. In two of these—Massachusetts by legislation creating a special board for the period of the war and Wisconsin through the regular powers of the Industrial Commission—it was possible to grant permits to plants making possible night work for limited periods. These laws applied to munitions plants. They had been enacted in time of peace and they expressed the opinion of the public in those States that night work for women was harmful because of its effects upon the health of women and their children, and because of its influence on family life. Moreover, experience had shown that night work was uneconomical for production, with less individual efficiency and greater cost for wages and supervision than by day. These considerations had led the representatives of 13 European nations, meeting in 1913 in Berne, to agree to eliminate night work for women in their manufacturing industries. In the war, however, this standard had been generally abandoned abroad. In England,

for example, where the employment of women at night work had long since been done away with, the increasing reliance upon the work of women in the manufacture of munitions had led to the general breaking down of this measure of protection.

At the very beginning of our participation in the war the Federal Government, through the Council of National Defense, had declared its policy of maintaining standards of employment during the war, and in particular those protecting the health of women and children. As these protective measures were for the most part contained in State rather than in Federal legislation, this declaration of policy took the form of an appeal to the States not to abandon or weaken the laws enacted for the protection of the workers, unless the Federal Government itself should find that the national war emergency demanded their modification. This, however, was to be a condition which the Federal Government alone should determine.

In applying this policy it was necessary to recognize that the differences between States gave rise to great inconsistencies. Thirty-six States had no legislation prohibiting night work for women. These included such important manufacturing States as New Jersey, Illinois, and Ohio, in all of which large quantities of munitions were manufactured on contract for the Federal Government. If the Federal Government recognized its responsibility for the conditions affecting the health of the women in munitions plants it could not ignore the fact that the employment of women at night in a factory in Illinois, where no law prevented, was as injurious as it would have been in a plant in New York, where night work had been eliminated by act of the legislature.

During the summer of 1918 the employment of women was rapidly extended, as the new draft resulted in the rapid withdrawal of men from the industries of the country. As a result of this increase in the proportions of women in the munitions industries their employment on night shifts became more general in States where no legislation prevented it, while in States having laws prohibiting night work the appeals of manufacturers, often indorsed vigorously by officers of the Ordnance Department, for modification of the enforcement of the law became more and more insistent. For the most part these were not requests from employers who were making the war an excuse to evade legislation enacted in the interest of the workers. Close study of them showed that they were evidence of the staggering load carried by the Ordnance Department in the necessity for greatly speeding up an already astounding program of production. The anxiety of Ordnance officers to eliminate every condition which seemed to them to hamper production in the slightest degree grew more and more tense. It looked very much as though the situation was developing to the point where the immediate need

for increased production in the most critical period of the war would undermine the standards established in time of peace to protect the health of working women.

To aid in developing a plan which would give due weight to all the apparently conflicting interests, the service called into conference representatives of the organizations most vitally interested in standards of working conditions established for the protection of working women. The whole plan, finally worked out after these conferences, was voted upon at a meeting of representatives of State labor departments called in Washington by the Department in October. Soon afterwards the conference of trade-union women called by the Woman in Industry Service also took action. Advice was also sought from the War Industries Board and representatives of employers were consulted.

At these conferences typical requests for permission to employ women at night were described. In one plant, for instance, which was probably more vital to the success of the ordnance program than any other single establishment, the chief reason for wishing to employ women on the night shift was a shortage of houses, which could not be remedied in less than three months, so that no large numbers of men could be added to the population of the town; but in the families of the men already living in the community were daughters, sisters, and wives who would be available to increase the working force. No two instances were exactly alike. The one fact common to them all was that the proposal to employ women at night could not be disconnected from the whole production and employment policy of the plant. In some cases the shortage of men for night work was due not to an actual shortage of labor in the community but to low rates of pay, or long hours on the night shift, or the absence of an efficient organization for employment management in the plant. Under such conditions it was not merely for the sake of the women workers that employment of women at night was to be discouraged. It was quite as necessary to discourage it for the sake of production, since in such a situation production could not be made satisfactory merely by night work of women. Satisfactory production required a thorough overhauling of the employment policy of the company which would result in a more effective use of the working force already available.

The conference revealed a very strong opinion that standards, in general, should not be lowered, and that, in particular, the practice of employing women at night should be vigorously discouraged. Overwhelming evidence from State departments of labor showed that the pressure against legislation prohibiting night work was becoming great, and that laws on this subject would be attacked at the coming sessions of State legislatures. It was feared that the attacks would be difficult to withstand because they would be made on the ground

of national necessity. Although there was diversity of opinion as to what should be done, it was generally agreed that it was only the National Government which could declare with authority whether or not the emergency was serious enough to require modification of standards which had commended themselves to the people of several States as necessary to protect the health of women at work.

The plan finally proposed was that the Federal Government should regulate and control night work for women in all plants working on war contracts for the Federal Government, through a provision in the contracts which would prohibit night work unless a special war emergency permit were granted. This plan provided that if it were demonstrated by the War Department or the Navy that it was necessary in a specified instance, in order to maintain adequate production to employ women between the hours of 10 p. m. and 6 a. m., the Secretary of War or the Secretary of the Navy, under conditions of employment approved by the Secretary of Labor, would send to the State agency charged with enforcement of labor laws a declaration that a national emergency existed in this particular instance and would call upon it to grant to a particular specified plant for a specified limited period a temporary war certificate. It was the opinion of legal advisers in the War Department and the Navy that in those States in which night work was prohibited by law these certificates would be valid under the war powers of the Federal Government. In those States having no laws against night work, the power of the Federal Government through its contracts was clear.

In connection with the administration of the proposed plan it was provided that thorough investigation should be made in each instance to determine the necessity for night work, and that each establishment to which a certificate might be granted should be under supervision, under conditions satisfactory to the Department of Labor. As showing the necessity for thorough investigation in advance it was pointed out that night work of women could often be avoided by the employment of men over the draft age and those not qualified for military service, by the transfer of men from nonessential industries, by the extension of plants, by the introduction of an industry into new areas, by a careful distribution of contracts with due regard to the local labor supply, or by the more effective use of the labor force of the plant through improved employment management. Certificates would not be granted unless it was clear that these methods had not sufficed to increase production to the point demanded for the prosecution of the war.

The plan in general was referred to the Secretary of Labor for action by the Council of National Defense. While this action was pending a conference of representatives of State departments of labor, called by the Department, was held in Washington. Following

a thorough discussion of the subject of night work, a resolution was adopted substantially as follows:

Resolved, That it is the sense of this meeting that we are opposed to the weakening of labor laws or labor standards, and if any temporary modification or suspension of such laws is necessary it should be made only on declaration of the Federal authority of competent jurisdiction.

A few days later a conference of women representing national and international trade-unions adopted a resolution to the effect that the standards and conditions regulating the employment of women at night should not be lowered.

The whole problem and the consideration given to it are recounted here because it had significance in revealing how complex is the relation between production and any phase of the conditions of employment, and how necessary it is to insist that conditions affecting the health of the workers shall not be lowered in the supposed interest of production. In the long run efficiency of management can make industry both productive and healthful for the workers. Experience points to the fact that production is made satisfactory through the delicate adjustment of many factors, in which high standards of labor are fundamental. The whole experience in dealing with the problem of night work revealed also the strength of public opinion against the employment of women at night. No state repealed a law against night work during the war.

State labor laws during the war.—While the subject of night work for women absorbed so much attention, especially in the last few months of the war, this was but one phase of the whole question of the enforcement of State labor laws in plants working on war contracts for the Federal Government and the necessity for co-operation between Federal and State agencies concerned in conditions of labor.

In several instances the jurisdiction of State officials was challenged in munitions plants, on the ground that the State did not have authority over Federal property. A decision of the Judge Advocate General of the Army on this subject caused some confusion in seeming to uphold this view, at least for certain types of contracts. To clear up the confusion the Department arranged to have inserted in all contracts a clause requiring full compliance with the labor laws of the State in which the goods are manufactured. Thus the observance of State labor legislation became a contract obligation of the manufacturer to the Federal Government, regardless of the jurisdiction of the State authorities in his plant.

Because of the great importance of State labor laws as measures of protection for women, the Woman in Industry Service gave a great deal of attention to this subject. Its director, acting as chairman of a special committee of the War Labor Policies Board, assisted

in formulating a plan of administration to render this clause of the contracts enforceable. Federal machinery for this purpose did not exist; and even if it had been available, the advantages of inspection and enforcement by State agencies seemed clear. It was more economical to use an administrative agency already equipped through past experience; it avoided duplication and left unimpaired the authority of the State officials when the war should end and when the jurisdiction of the Federal Government would again become relatively insignificant.

Wages and industrial relations.—The introduction of women into new occupations gave the question of their wages a new significance. If their employment in work hitherto done by men were made the occasion for reducing the rates previously paid for the same work, the men employed would naturally oppose the extension of woman's employment as a menace to the wage standards attained by the men, and the morale of industry would be affected by the resulting discontent. It was a realization of this danger which led to the first official indorsement by the Federal Government of the principle of "equal pay for equal work." The Chief of Ordnance included it in his recommendations to arsenal commanders and manufacturers and the Quartermaster General concurred when he issued the same recommendations simultaneously. Later the principle was made even more imperative through its inclusion in the statement of principles to govern industrial relations which was formulated by the National War Labor Conference Board.

It soon became evident, however, that the idea expressed in the usual phrase, "equal pay for equal work," was not comprehensive or fundamental enough to secure substantial justice for working women or to prevent the lowering of standards through the extension of their employment. The principle was inadequate, first, because it was not held to apply to those occupations in which the introduction of women required some change in process so that the work was not considered equal because it was not identical; second, the principle was insufficient because it failed to remedy fundamental defects in the usual basis for determining women's wages.

A thorough application of the principle of equal pay for equal work would seem to have required that wages should have been based on output and that they should have been set only after careful study of the actual effect of the new arrangement of work on the output of the group as a whole, rather than an arbitrary reduction to levels customarily regarded as the standard for women. It was by no means impossible to find instances where these new methods of doing the job had resulted in an increase in output when women did the work, and in these instances the injustice of a reduction in earnings was more clearly emphasized.

In formulating standards for the employment of women the service, therefore, made the following recommendation:

Women doing the same work as men shall receive the same wages, with such proportionate increases as the men are receiving in the same industry. Slight changes made in the process or in the arrangement of work should not be regarded as justifying a lower wage for a woman than for a man unless statistics of production show that the output for the job in question is less when women are employed than when men are employed. If a difference in output is demonstrated, the difference in the wage rate should be based upon the difference in production for the job as a whole and not determined arbitrarily.

Wages should be established on the basis of occupation and not on the basis of sex. The minimum wage rate should cover the cost of living for dependents and not merely for the individual.

The war proved the capacity of women for many more tasks than those previously open to them. The Woman in Industry Service held that the experience of the war was forcing a fresh examination of the basis for determining women's wages. If the principle of equal pay for equal work be accepted, it is impossible in logic or in justice not to push its application further and to accept the more fundamental conclusion that the wage value of a job is as great when a woman does it as when a man does it, and that the wage should be determined for the occupation and not for the sex of the worker. The Woman in Industry Service, therefore, formulated the following statement of the basis for determining wages:

Wages should be established on the basis of occupation and not on the basis of sex. The minimum wage rate should cover the cost of living for dependents and not merely for the individual.

That the experience of the war in England was forcing thoughtful observers to a similar searching for a fairer relation between men's and women's wages is shown in the report of the War Cabinet on Women in Industry, published in the spring of 1919. The main report follows traditional lines, but the minority report declares "that the essential principle which should govern all systems of remuneration * * * is that of the clearly defined occupational or standard rates * * *. There is no more reason for such occupational or standard rates being made to differ according to the workers' sex than according to their race, creed, height, or weight."¹

In the United States the formulation of these principles with reference to women's wages and the official indorsement of the policy of equal pay for equal work, limited and vague as it is, undoubtedly had a wholesome influence on public opinion, but unfortunately the authority and the machinery to enforce these principles was lacking.

From time to time the War Department and the Navy called on the Department for advice on wage problems for women producing war materials. State minimum wage commissions also sought advice

¹ Report of the War Cabinet Committee on Women in Industry, p. 254. London, 1919.

from the service and wage disputes affecting women were from time to time brought to its attention. The assistant director of the service was assigned to give special attention to the subject of wages and industrial relations. It proved to be a field fruitful in thought but exceedingly limited in the possibility of effective action, especially, as the majority of the women in the war industries were unorganized and hence without means of making their needs articulate. Undoubtedly, in the future, as the whole question of the wage basis in industry will demand searching inquiry, the relation between women's wages and men's wages must be thoroughly analyzed.

Training.—Closely related to wages is the necessity for giving women the same opportunity for technical and vocational training that men receive. The Woman in Industry Service was not charged with any special responsibility for a program of training for women workers. This subject is the permanent responsibility of the Federal Board for Vocational Education. For the temporary war needs of both men and women, the Training Service was organized in the Department of Labor. From time to time, however, the advice of the Woman in Industry Service was sought by employers, and conferences on this subject were held by representatives of the service with officers of the International Association of Machinists. The director of the service served as a member of the committee on the relation of military and industrial man power appointed by the War Labor Policies Board during the period when the committee was giving special attention to coordinating in a single program the efforts of the various Federal agencies directly interested in training workers.

Relations with employers and workers.—To assist in furthering the development of wiser policies in industry itself in dealing with women workers by furnishing training for employment managers, the director of the service served as a member of the employment management committee of the War Industries Board. The service also responded to requests from employers for advice by sending information or by making plant inspections. The tentative draft of the standards to be recommended by the service were submitted for comment to the executive officer of the National Industrial Conference Board and to an informal conference of representatives of employers and workers in the metal trades.

Reference has already been made to the conference of women representing national trade-unions which was called in Washington by the Woman in Industry Service to formulate a platform in the interest of women workers. This conference voted to become a permanent advisory council of working women. Through this council the service has been able to keep continuously in touch with the needs of the women employed in the largest industries and to have their advice in its plans and policies.

Public interest in women's work.—Before the armistice was signed, the service planned an educational campaign, chiefly through a traveling exhibit and lantern slides, which had the twofold purpose of recruiting the women needed to release men for military service, and at the same time showing the standards of employment necessary to make their work effective. It was hoped in this way to draw together various agencies, including women's clubs and other organizations which had planned recruiting campaigns. The signing of the armistice changed the immediate purpose of the exhibit, and it was finally developed with a change in emphasis to meet the altered conditions of the postwar period.

Lack of statistics concerning women in the war industries.—So many questions have been addressed to the Woman in Industry Service regarding the numbers of women in the war industries and the detailed statistics concerning them that it becomes necessary to point out that the appropriation of \$40,000 granted to the service would not have sufficed for so large a statistical inquiry. The service was not intended to be a statistical agency. Its activities in this matter were necessarily limited to making recommendations to the Bureau of Labor Statistics as to the type of information which seemed important to have collected at regular intervals. Through the Bureau of Labor Statistics and the War Industries Board a schedule of facts about labor conditions, including the employment of women, was prepared for use by the community labor boards organized by the United States Employment Service. Like so many other plans, the signing of the armistice found it uncompleted, and as a result we are without any comprehensive statistics of the part taken by women in industry during the war.

ACTIVITIES AFTER THE SIGNING OF THE ARMISTICE ON NOVEMBER 11.

After the armistice the Woman in Industry Service submitted a memorandum dealing with problems likely to arise for women in industry during the period of readjustment. Obviously the immediate task was the same on behalf of either men or women workers to accomplish the change from war to peace with the least possible unemployment and with the reinstatement of the largest possible number in occupations for which they were best adapted. The memorandum assumed that the fundamental aspects of the program as affecting both men and women were being worked out by the Department, especially a policy with reference to cancellation of contracts and demobilization of the Army which would take into consideration the effect on labor conditions. For women, however, this was not the whole problem, for the armistice marked a decided change in public opinion. The withdrawal of women from their work was advo-

cated as a means of providing employment for returning soldiers. However, women, like men, were working to earn a living and their continued employment was vital for them and for those dependent upon them.

The Woman in Industry Service urged that the permanent status of working women be recognized; that the Federal Government recommend definite standards for their employment in private industry, and that these standards be adopted in Government-owned plants; that a program of public education be pushed forward to secure the adoption of these standards as designed to promote the welfare of wage-earning women; and that as the power of the Federal Government to control working conditions through provisions in contracts would now be lessened with the curtailment of contracts, the Federal agencies should endeavor to stimulate those instrumentalities through which conditions would be determined, namely, State labor legislation, voluntary action of employers, action by working women themselves, and the continuing influence of public opinion.

Labor legislation.—For active cooperation between State and Federal departments of labor, the experience during the war afforded a precedent, and the Woman in Industry Service welcomed every opportunity to work with State departments or to assist local groups in their efforts to strengthen the labor laws in their State. In Indiana a survey was made at the request of the governor and the industrial board, the results of which were published in January. This was followed by a State-wide campaign organized by local committees, in which members of the staff of the service assisted. In connection with this campaign a conference of neighboring States was held which brought together in Indianapolis representatives of interested groups in Ohio, Kentucky, and Illinois.

Assistance was also given by the service in efforts to strengthen labor laws in Minnesota, Connecticut, Iowa, New York, Rhode Island, and Kansas, and the service was represented at the convention of the Association of Governmental Labor Officials in Madison, Wis., where the representative of the service presided at the session on women in industry.

Wages after the war.—It was the prevailing opinion that wages during the war had been so high that all workers were receiving enough to support themselves. This impression was based on statements of high wages paid in the munitions plants. It seemed important to verify this impression, and for this reason the Department responded to the request of private organizations in Philadelphia to investigate the wages paid to women in the candy trade there. Investigations before the war had indicated that a large number of the workers in the candy trade were receiving less than a living wage.

The investigation covered factories employing two-thirds of the workers in the candy industry in Philadelphia. It was found that wage rates had increased considerably since before the war, but the rapid increase in cost of living had resulted in largely nullifying the effect of these increased rates, so that a considerable proportion of the workers were receiving less than the amount considered necessary to meet the cost of living. A significant fact brought out in the investigation was that continuity of employment is even more important than a fair rate of wages. Frequent loss of time, whether due to lack of work or to personal causes, decreases production and curtails earning power.

The service cooperated with the Minimum Wage Commission of the District of Columbia, especially in its work of determining minimum rates for employees in mercantile establishments in the District, and in connection with Government-owned plants considerable attention was given to the subject of wages. The staff of the service was not sufficient to permit more extensive statistical studies along this line.

The Federal Government as an employer of women.—Although as has been pointed out, the power of the Federal Government to control conditions through its contracts decreased rapidly when war production no longer was necessary, it remained true that in its own plants, and through its departments employing women, the Government could set standards which would have an important influence on private industry.

At the request of the Secretary of the Navy, the Woman in Industry Service undertook to serve as an adviser to the Navy Department in matters affecting women employed in navy yards. Inspections were made and reports and recommendations submitted covering such subjects as readjustment of wage rates, better working conditions, organization of lunch rooms, and improved methods of employment management. Because the curtailment of work in the navy yards necessitated laying off numbers of workers, special attention was given to recommendations designed to prevent hardship by giving due notice before dismissal.

The service was also asked to cooperate with the Ordnance Department in matters relating to the employment of women in Government arsenals, and inspections similar to those made in the navy yards were in progress at the close of the period covered by this report.

The service also gave attention to questions affecting Government employees in Washington, especially in cooperation asked for by the Commission on Reclassification.

Negro women in industry.—By November the service found it opportune to consider the economic problems of Negro women. Accordingly an industrial agent was appointed and was sent out to survey several centers where typical conditions were known to prevail.

Within several months, the agent has investigated conditions among more than 16,000 Negro women employed in 156 plants located in the Middle West and in border-line States of the South in highly diversified industries. These industries may be grouped under five broad headings, viz, factory, hotel, department store, stockyard, and Government work. General standards for this class of workers were found to be somewhat lower than the average, and their industrial opportunities were found to be decidedly more restricted than those of other women. Remedial suggestions have been formulated and submitted to several agencies interested in the improvement of existing conditions—progressive employers, cooperating welfare organizations, and Government investigators.

Largely because of the abnormal situation obtaining under the war emergency, both conclusions and recommendations are necessarily tentative; but a survey involving reconstruction conditions is in progress.

Displacement of women workers.—A change in public opinion following the signing of the armistice has been indicated. A most significant illustration of difficulties faced by women workers was the situation in connection with the employment of women as conductors on the Cleveland street cars. The men objected to the employment of women and after the signing of the armistice asked for their dismissal. It is unnecessary to review the details of the involved case, which came before the War Labor Board. Although the board finally recommended that the women be retained, they were not reemployed.

The Woman in Industry Service had no official relation to this case, but because of its significance the director and assistant director, as individuals, filed a statement with the War Labor Board pointing out the desirability of freedom of choice of occupation for women in industry. In a somewhat similar case on the street railways of Detroit facts showing the home responsibilities of women workers were compiled by the service and filed by the attorney for the women at the hearing before the War Labor Board.

The dismissal of women from the street railways in Brooklyn was assumed to be due to the enactment of a law by the New York State Legislature prohibiting night work. The Woman in Industry Service offered its assistance to the Industrial Commission of New York State, and while the commission through its bureau of women in industry was making an investigation of the facts in Brooklyn, the service sent representatives to Chicago, Kansas City, Detroit, Boston, and Baltimore to get the facts about hours and working conditions for women employed on the street railways in those cities.

Allied to the whole subject of curtailment of opportunities for women workers was a brief survey of the status of women in the metal trades in Michigan. This inquiry showed that considerable numbers of

women had been laid off from Michigan plants, and that in some instances opportunities gained during the war were not likely to be permanent.

Home work in Bridgeport.—At the request of local groups an investigation of home work in the corset trade in Bridgeport was undertaken. It was found that a considerable amount of work was given out in the manufacture of garters, which is an industry allied to that of corset making, and that the work was carried on often in crowded, insanitary surroundings, and sometimes during the illness of members of the family suffering from infectious or contagious diseases; that a lower wage rate apparently was given than would be paid for similar work in a factory; that because of the absence of supervision production was likely to be unsatisfactory and earnings very low; and that child labor was utilized to the detriment of the welfare of children. Recommendations were made to the employers that the practice of giving out home work should be discontinued as soon as possible, and that in order to make this change with the least possible hardship for the workers, detailed plans be worked out at a conference representing employers, workers, and social organizations in the community.

Public interest.—Early in November the Department invited employers to submit photographs illustrating working conditions for women, and as a result of their generous response a collection of several hundred photographs are on file. These photographs and other material have been made the basis of a series of panels illustrating the standards recommended for the employment of women. Stereopticon slides have also been prepared. The material has been widely circulated among State departments, schools, colleges, labor organizations, and other groups interested in improving conditions.

The results of investigations made by the service have been printed in pamphlet form and, in addition, representatives of the service have taken part in conferences and assisted local groups in arousing public interest in the conditions of women's employment.

Permanent status for Women's Bureau.—Women in industry in 1910 constituted more than 21 per cent of the total number of persons gainfully employed in the United States. It is not only their importance in numbers but the special problems of their employment affecting industry on the one hand and family life and child welfare on the other which necessitates special provision by the Federal Government for a clearing house of policies and facts relating to their position in industry. The wisdom of Congress in designing such an agency as primarily policy making rather than itself executive seems to have been demonstrated in the actual experience of the Woman in Industry Service in securing cooperation and stimulating the activities of other agencies.

The problems of women following the war are likely to be more crucial than at any time during the past. The Woman in Industry Service has been continued by Congress through an appropriation enabling the Secretary of Labor to carry forward the investigations of women in industry during the fiscal year ending June 30, 1920. Because of the fundamental importance of the position of women in industry it is hoped that the Women's Bureau will be permanently established by legislation as a part of the Department of Labor, and that its resources will be enlarged in order to make possible more comprehensive work.

INVESTIGATION AND INSPECTION SERVICE.

Origin and functions.—The Investigation and Inspection Service was created under the War Labor Administration, with an appropriation of \$300,000, for the purpose of concentrating into one division and under one head the investigation work required by the various branches of the Department. The service was organized during the latter part of July, 1918.

The function of the Investigation and Inspection Service in the War Labor Administration was outlined as follows in a memorandum of the Secretary of Labor:

A force of investigators will also be needed for the various other services here contemplated.

In view of the fact that the service of an inspector, examiner, and investigator may often be combined in one man, especially at the beginning of the work, and also that the handling of a field force which travels from place to place is a large task in itself, I believe that the greatest economy and efficiency can be obtained by combining these field forces under the Secretary and with one inspector in charge, in a special service to be called the "Investigation and Inspection Service."

It will be my purpose to require all new services of the Department to use this Investigation and Inspection Service, so far as possible, in all their field work. For this purpose the inspector in charge of the service will provide, upon consultation with the other branches of the Department, methods of inspection, investigation, and examination, including blank forms for reports on the various necessary subjects, and will transmit such reports when made to the various branches to which they belong.

This service was organized with a view to making quick investigations of acute industrial situations and reporting the facts promptly to other divisions of the Department authorized to deal with such situations. A corps of about 50 investigators and inspectors was employed.

The Investigation and Inspection Service was authorized to make investigations and inspections only at the request of the other branches of the Department. Divisions of the Department which availed themselves of this service for part, if not all, of their investigating work were the Secretary's Office, Division of Conciliation, United States Employment Service, Division of Negro Economics, Bureau of Immigration, United States Training Service, Woman in Industry

Service, and Working Conditions Service. Through the medium of the Secretary's Office extensive investigations were also made for the War Industries Board and the Ordnance Department of the Army.

The War Industries Board, during the latter part of 1918, made extensive use of the Investigation and Inspection Service for the purpose of determining the facts and conditions obtaining in establishments holding Government contracts for the manufacture of war material, where delay in delivery under the contract was said to be due to adverse labor conditions. About 150 cases of this kind were investigated by the Investigation and Inspection Service. With information at hand as to the actual conditions causing the delay in the delivery of war material, the War Industries Board was enabled to take prompt action to correct the difficulty, and was in a position to know to what extent labor conditions as such were delaying manufacture. In many cases the very fact of the investigation was sufficient to bring about a readjustment by the concern involved; in other cases conditions were shown to be such that further contracts were denied.

The War Industries Board also asked for an investigation of the tin can manufacturing industry, to determine the most efficient methods of manufacture and to obtain data on the extent of wastage of material due to inefficient and antiquated methods. This investigation was an exhaustive one, embracing most of the tin can making establishments in the East and the Middle West. Although the War Industries Board was discontinued before the final report on this investigation could be made, the very valuable material contained in the report has been placed at the disposal of the United States Grain Corporation of the Food Administration for their guidance in the matter of placing contracts for food containers.

At the instance of the Bureau of Labor Statistics and the Bureau of Ordnance of the War Department, jointly, a survey was made of the chemical industry, which furnished a description of occupations in the industry and a study of the degree of skill and training required for each occupation.

A similar study was made for the Woman in Industry Service and the United States Training Service, jointly, of the piano industry. This survey was made to furnish data on the matter of "vestibule training," which is widely practiced in the industry; to determine how far piano workers could be adapted to and used in the manufacture of aeroplanes; and to obtain data relative to opportunities in the industry for women.

The United States Employment Service requested an extensive and detailed investigation of the powder plants at Jacksonville, Tenn., and Pompton Lakes, N. J., to determine the causes of the inordinately high labor turnover at Jacksonville and to secure

accurate information concerning the conditions of women's employment at Pompton Lakes. The two investigations were exhaustive, and as a result of the report of conditions at the two plants many of the objectionable features were corrected by the company.

An extensive industrial survey was made by the Investigation and Inspection Service for the Division of Negro Economics, showing the comparative labor turnover of Negro and white labor in war industries and also furnishing data relative to opportunities for colored workers, both men and women, in the industrial field.

One of the most important investigations conducted by the Investigation and Inspection Service gives the wages of seamen on American and foreign vessels sailing from American ports, showing the effect of the seamen's act on foreign vessels operating in American ports. This report has been printed as a Senate document.

The Investigation and Inspection Service undertook to prepare a list of available farm lands in eastern and southern States suitable for cultivation by returned soldiers. The survey was to furnish the acreage, condition, and exact location of unused available lands. This work failed of completion for lack of time, although the information desired was obtained in Georgia, North Carolina, and Virginia.

At the time of the organizing campaign conducted by the Amalgamated Association of Iron and Steel Workers to organize the steel-mill employees of the Pittsburgh and Johnstown districts, many complaints reached the Secretary's Office to the effect that municipal officials were using their offices and authority to interfere with organizing activities. This matter was turned over to the Investigation and Inspection Service to ascertain the facts, and an accurate and comprehensive report was made as to the extent of such interference. Later complaints that the steel companies were discharging all employees joining the union were investigated by the service. With evidence at hand showing that such a practice was being followed at the steel plants, the director of this service held a conference with officials of the Midvale Steel Co., of Johnstown, Pa., and secured from them a declaration that such practice was contrary to the policy of the company and would be stopped. Subsequently the superintendent of the Midvale Steel Co. severed his connection with the company, and the company fully recognized the right of its employees to organize.

The Investigation and Inspection Service has been of much value to the Division of Conciliation not only by furnishing accurate information for the use of the conciliators but frequently by averting through its investigations what might have become acute situations. Many cases of unfair discrimination against union members, cases of unjustifiable discharge, and of low wages have been investigated by the service and have been corrected, upon the establishment

of the facts without the need of a conciliator. An instance of the good results following the prompt action of the Investigation and Inspection Service in cases of threatened trouble was that of a condensed-milk concern in Utah, where a strike was imminent because of a very low wage scale. This concern was working on Government contracts. An agent of the Investigation and Inspection Service then in the West determined the facts as to the wage rate paid at the factory. The superintendent, while admitting the wages were too low, stated that they were controlled from the New York office and he had no authority to change them. This fact was reported by the agent. The matter was then taken up with company officials in New York, who promptly telegraphed authorization for a substantial increase in wages for the Utah plant. Many similar cases could be cited.

The activities of the Investigation and Inspection Service cover a very wide field. One investigation of importance dealt with wages and conditions of women home workers working on Government contracts for tobacco and parachutes in Lancaster, Pa. Another established the facts relative to the recent strike of Chinese waiters in New York City. A survey was made of the fur-manufacturing industry, to determine the prospects for expansion and for the establishment of apprenticeship training looking toward greater skill. Many cases of failure to comply with Government standards of wages and hours on Government contracts have been investigated and adjusted. An inspection which disclosed seriously objectionable sanitary conditions in a shipbuilding plant resulted in material improvements.

At the time of its dissolution the Investigation and Inspection Service was engaged in an investigation of the extent of probable emigration of aliens to their home countries. So far as conducted this investigation embraced the meat and food packing centers of Chicago and vicinity; the Indiana, Ohio, and Pennsylvania steel-mill districts; the Pennsylvania coal-mining area; New England manufacturing centers; Greater New York and vicinity; and other centers of large alien population. Figures and estimates were obtained of the prospective emigration of aliens, by nationalities. This work was necessarily curtailed because of the brief time at the disposal of the service and was incomplete when the service was discontinued. However, sufficient data were secured to afford a basis for computation of the extent to which industry will be affected by alien emigration.

The Investigation and Inspection Service was a highly important adjunct to the Secretary's Office because of its ability to obtain facts and ascertain conditions immediately, when such facts were needed. The prompt investigations of legitimate complaints on

the part of the workers did much to foster the spirit of cooperation and confidence between the Department and the workers. The specific instances cited are only the most important of the many cases handled by this service.

The Investigation and Inspection Service was discontinued on June 30, 1919, returning an unexpended balance of approximately half its original appropriation.

UNITED STATES TRAINING SERVICE.

As originally instituted this service was known as the Training and Dilution Service, but with the signing of the armistice the need for dilution of skilled labor ceased and the name of the organization was changed to United States Training Service.

Origin and functions.—The act establishing a War Labor Administration carried an appropriation of \$150,000, "to enable the Secretary of Labor, during the present emergency, to carry on the work of war labor administration * * * the training and dilution of labor * * * Training and Dilution Service, \$150,000." In the memorandum of the President directing the Secretary of Labor to form a war labor administration appeared among other instructions that of creating an agency to furnish—

a satisfactory method and administration for training of workers; an agency for dilution of skilled labor as and when needed.

The Secretary of Labor outlined the purposes of the service in a letter as follows:

In connection with the work of the Secretary of Labor in promoting and developing the welfare of the wage earners of the United States by advancing their opportunities for profitable employment, it is frequently necessary to consider the matter of assistance to wage earners by the promotion of the best shop methods for their training. In this connection it is not the purpose of the Department to enter in any sense into the educational field either in its general aspects or in the special matter of vocational education. The Secretary is a member of the Federal Board for Vocational Education and intends in no way to duplicate its work.

But the work here proposed is or may become of vital importance, especially in the industries most essential to the war. Already training facilities for workers are being found necessary and are being provided for shipyards under the Emergency Fleet Corporation. The need in other lines is not quite so clear, but indications are sufficient to show that provisions must now be made for such a service.

A service of this sort requires the employment of experts who are familiar with the best methods now being used for shop training, and the promotion of the use of such methods by information carried to the employers and wage earners.

The Training and Dilution Service was instituted July 16, 1918, and Charles T. Clayton, theretofore assistant director general of the United States Employment Service, was appointed director.

The first problem of this new service was to discover the best methods used in various plants for training persons to do skilled

and semi-skilled work; to ascertain the industries and particular plants needing larger supplies of trained workers than could be found through the efforts of the United States Employment Service; to determine the special types of employment in which training appeared to be most needed to meet the existing war emergency; and to organize and promote the adoption by employers of the most practical and useful methods of training.

Organization.—Four principal divisions were established within the service as follows:

I. Planning Division: (1) Training Methods Section, in charge of studies of existing training methods in the United States and elsewhere, preparation of plans for instituting and carrying on training in industries and for improving training where being conducted, coordination of methods with the work of the Federal Board for Vocational Education, and uniting all training activities into a comprehensive educational scheme for all industries; (2) Research Section, in charge of collection and analysis of written and printed reports of training for the use of the service; and (3) Information Section, in charge of preparation of bulletins, reports and news articles for publication, and information regarding the work of the service for the use of employers and employees. In this section all editorial work on pamphlets and bulletins was done in collaboration with the Research and Training Methods Sections.

II. Administrative Division: (1) Personnel and Accounts Section, to keep all records of personnel and all accounts of expenditures and allotments; (2) Statistics and Reports Section, to record all operations in the field and prepare tabulated analyses of industrial conditions for the information of the service; and (3) Correspondence and Files Section.

III. Training Division: To supervise the field service by districts as follows: (1) Maine, New Hampshire, Vermont, Rhode Island, and eastern Massachusetts; (2) Connecticut and western Massachusetts; (3) northern New York; (4) southern New York and northern New Jersey; (5) eastern Pennsylvania and southern New Jersey; (6) southwestern Pennsylvania, West Virginia, and Jefferson and Belmont Counties in Ohio; (7) Maryland, Virginia, North Carolina, and South Carolina; (8) southern Indiana, southern Ohio, Tennessee, Louisiana, Mississippi, Alabama, Georgia, and Florida; (9) Michigan; (10) northern Indiana, northern Illinois, Iowa, Wisconsin, Minnesota, North and South Dakota, and Montana; (11) southern Illinois, Missouri, Arkansas, Texas, Oklahoma, Kansas, Nebraska, Wyoming, Colorado, New Mexico, Arizona, Utah, Idaho, Nevada, California, Oregon, and Washington; and (12) northern Ohio, and Mercer, Crawford and Erie Counties in Pennsylvania.

IV. Dilution Division: To undertake surveys of the war industries, to determine occupations within such industries where the available supply of skilled workers was so limited as to necessitate introduction of less skilled workers, and to promote skilled workers already in such employments to supplement the diminished labor supply to meet war needs. The division had been organized and was about to start its work when on November 11, 1918, the signing of the armistice rendered further operations of the division unnecessary.

Activities of the service.—Before the Training and Dilution Service was established the labor committee of the Advisory Council to the Council of National Defense had set up a voluntary subcommittee to promote interest in industrial training. This committee had carried on a great deal of promotion work, and upon organization of the regular governmental agency, the head of that subcommittee was appointed chief of the Training Division and sent out to find competent men to act as field superintendents of training. The field districts were established on identical territorial lines with those selected by the Ordnance Division of the War Department and the field superintendents were by courtesy of the Ordnance district chiefs provided with quarters in nearly every district, with the added advantage that the daily reports of Ordnance inspectors greatly simplified the problems of finding those war industries and plants most in need of training assistance. Due largely to the assistance of the Ordnance, Engineers, Signal Corps, and other field organizations of the War Department it was possible for the Training and Dilution Service in the few months of its existence before hostilities ceased to secure the training of about a half million industrial workers in the war industries.

An example of effective cooperation between the Ordnance officials of the War Department and the Training Service of the Department of Labor was the work in the Philadelphia district. The Ordnance chief of that district early appreciated the value of industrial training in increasing production and offered assistance to the Training Service then being organized. One of the most experienced training men of America was dispatched to Philadelphia and installed in the Ordnance offices. The district chief of Ordnance assigned five men from his forces to work under the training superintendent, and an intensive survey was made of the whole district, both plant and public-school facilities for training. Fifty-two plants were shortly got into line for various types of training and plant training departments actually instituted in a considerable number of them within the few months preceding the armistice. At the same time 17 large schools and colleges in the same territory were surveyed, stock taken of their equipment suited for mechanical-training purposes, and ar-

rangements nearly completed to launch a comprehensive program under which young people could commence apprenticeship courses in a half dozen vitally important war industries, through joint leadership of the United States Training Service, the Ordnance Department, and the Philadelphia public-school authorities. The ending of hostilities, however, obviated the necessity for such extensive action.

The methods of the field service were as simple as the philosophy of industrial training, comprising visits to employers found to be in need of higher average output, explanation of industrial training, analysis of the plant, preparation of plans for setting up training adapted to the special local needs, and assistance to the employer in selecting from his own personnel those fitted to do the training. After the training school had been set up, the superintendent of training visited the plant at intervals, watching the work of the instructors, suggesting improvements, and reporting the progress of training both to the employer and to the director at Washington. The Training Methods Section at Washington, assisted by these reports and the data compiled by the Research Section, worked out plans for more expeditious or more thorough training, which from time to time were sent to all field superintendents and to established training schools conducted by employers.

Because of the lack of organized methods and of trained persons capable of teaching more than from any pronounced objection upon the part of employers, in most plants the training given was quite limited, frequently going no further than teaching new employees a simple process or short sequence of processes. As time passed, however, it became evident that more thorough and comprehensive training offered advantages to both employers and workers, and when hostilities ended many plants were establishing elaborate schemes for training, involving progressive steps from a few days for simple processes to three-year courses for apprentices, including mathematics, design, stresses and weights of materials, and other elements making up a thorough training in the crafts taught. One of the first bulletins issued by the service described these courses as prepared by a large manufacturing plant at Utica, N. Y., where 10,000 square feet of floor space was set apart for training new employees upon a variety of operations, including milling, grinding, profiling, drilling, screw machine operating, inspecting, assembling, general bench working, special and automatic machine operating, barrel making, and lathe turning. At first employees were taught a single operation, but later were given an opportunity to return for training on additional machines, and a program was evolved covering 48 working days, utilizing the facilities of the plant's five tool-making departments, in addition to the training-department space, to give a very intensive

course to promising employees upon special operations. With this course lectures, use of three excellent textbooks, and a night course in mathematics, mechanical drawing, and blue-print reading and interpretation were also given. A third division of the training program took up training of machine and tool adjusters, the pupils being men already experienced in production work. This course led to foremanships.

In another very large plant in Indiana experience with the training department brought about the practice of hiring no employee until he had shown by a test in the training room that he actually did know the work for which employed, and courses covering every phase of work in the factory were outlined and put into practice. This school is still in full operation.

With the termination of active hostilities, 147 training departments were in full operation in war industries, including some of the largest industrial establishments in America. Training ranged from several months to only a day or two, but was steadily being lengthened and improved, the standards being raised and the requirements made more rigid. Immediately after November 11 many war contracts were canceled, and extensive reductions of labor forces began. For a time it seemed that all training departments would be closed, but shortly afterwards it was found that the value of systematic training had only begun to be realized. The assistant director of the Training Service, with the aid of a splendid corps of zealous workers, conducted constructively suggestive scientific analyses of the industrial situation. It became clear that the greatest service of the Department to industrial training lay less in promotion of plant training schools than in the development of sound methods which employers themselves might institute.

Although the dilution work was discontinued, the field service was retained but used principally to gather information for the Planning Division, acting in an advisory way to such employers as desired assistance in setting up training departments but emphasizing the study of existing training and development of improved methods.

After several conferences and preliminary study of various industries, some of war and some of nonwar type, it was determined that during the remainder of the fiscal year the United States Training Service should work entirely upon the preparation of sound methods for use of employers in plant training departments to be published in pamphlet form, except for the maintenance of a smaller field force of competent plant advisers to care for requests from employers for assistance.

Accordingly assignments were made of experts in the fields of shoe and rubber manufacture, foremanship practice, general training methods, foundry practice, garment making, textile methods, piano

manufacture, lithography, and paper-box making. These experts were instructed to proceed to the localities in which were representative plants engaged in their respective specialities, to assemble staffs of competent men, and in the light of their own experience as trainers to construct plans for adequate training of employees for each such industry, the plans to consider (a) training of existing labor forces for higher efficiency and wider knowledge of their employments, (b) training of new labor, and (c) training of experienced workers to be foremen.

Through the hearty cooperation of employers' associations and individual employers, large staffs of technically qualified men, frequently of a type no money compensation could have interested, were assembled; and these men worked literally night and day to adequately cover their important tasks. From early in January until the 30th of June these staffs were engaged in following working processes, checking up their data, comparing results, and slowly evolving material of great practical value to the industries studied.

The following bulletins were completed during the fiscal year, although some of them did not issue from the printing office until after the end of the period.

Bulletin
No.

1. How to start a training department in a factory.
2. A successful apprentice toolmakers' school.
3. British methods of training workers in war industries.
4. Training employees for better production.
5. Training labor for peace time.
6. Labor turnover and industrial training.
7. Industrial training and foreign trade.
8. Some advantages of industrial training.
9. Seven million candidates for training.
10. A business man's experience with industrial training.
11. Efficient training in a large plant.
12. How training departments have bettered production.
13. Industrial training in representative industries.
14. Training in industrial plants.
15. Paper-box manufacturing.
16. Training in the men's suit and overcoat industry.
17. Training workers in the women's cloak and skirt industry.
18. Industrial training in the overall industry.
19. Training for shirt makers.
20. Training in the rubber industry.
21. Training in the shoe industry.
22. Courses of instruction in piano making.
23. Outline courses for instruction in lithography and photolithography.
24. Foundry training methods.
25. Courses of instruction for workers in cotton mills.
26. Foremanship training courses.

If time had permitted, similar studies in several other industries could have been completed, but it was found impossible to prepare for publication within the limited period any more of the wealth of material at hand. More than 20 important industries were on the lists of the service, requesting studies to be made and courses prepared for their use, when the appropriations for the service were discontinued.

Meantime, employers in those industries that were being studied were becoming greatly interested, as is shown by the following table of training reported to the service in the week before operations ceased:

Table showing the status of training in industrial plants on June 30, 1919.

District.	Companies with training departments in existence June 30, 1919.	Training departments discontinued.	Establishments interested in training June 30.	
			Interested, asking advice.	Preparing to install training.
1.....	26	7	8	7
2.....	35	7	13	5
3.....	109	6	73	12
4.....	53	8	10	29
5.....	35	20	68	17
6.....	7		1	
7.....	2			1
8.....	21	13	30	13
9.....	10	2	10	1
10.....	32	2	27	21
11.....	13	1	1	3
12.....	16	1	6	16
Total.....	359	67	247	125

With 359 training departments in existence and only 67 departments discontinued within six months after the close of hostilities, evidently industrial training is found by the industries themselves to be of practical value for peace-time service. The further fact that on June 30, 247 establishments were reported asking for advice and contemplating instituting training departments and 125 other establishments were preparing to install such departments, many of them held up because the Training Service could not assign them the advice of one of its officers, the growing interest of the industries is manifest.

Much of this interest is due to the work of the chief of training. After the service undertook as its principal aim the preparation of training methods, he devoted his time to attending meetings of employers, in conventions and associations, and there explained to them the purposes of the service and the possibilities of training as a means of interesting their employees in developing themselves. Hundreds of employers were thus induced to look into the subject and they requested advice and assistance. But almost an equal factor was the interest of competitors. Employers began to find that where

a rival had a good training department a better class of employees sought his employment for the wider opportunities afforded them; that better grades of work were turned out and better wages earned, with consequent decreased turnover and cheaper production even on higher wage scales. Whereupon they also asked for advice, and from this source increasing interest was being shown during the latter months of the service.

The greatest value of such a service as this, however, lies in the preparation of methods and the conduct of a clearing house of information for industries. Industrial training is pedagogic, but it is also experimental. The methods of the pedagogue, as traditionally employed, fail conspicuously. Teachers of the school type rarely succeed in a training department. They do not understand the necessities of the factory, which require a kind of discipline, both mental and physical, different from that of the school. The standards of factory production differ radically, both in kind and degree. In schools the "passing mark" of 65 to 75 per cent satisfies. In industry nothing will do but 100 per cent quality in any well-organized establishment. Product falling below the top grade is either "seconds" or rejected. Workers must produce "firsts" habitually or they can not be retained. In the industrial school perfect product must be coupled with adequate output to pay costs of operation, and the school being really a miniature factory run with factory methods, rather than a laboratory, production must be on a production basis. These two fundamental elements—perfection of product and sufficiency of output—are not included in the instruction of the schoolmaster, so that in setting up training departments the service found it necessary to seek instructors from the ranks of workers rather than from other sources. Employers and workers both realize this, and when training of a practical type is provided employees seek it with enthusiasm. In many plants where comprehensive training schemes were adopted, waiting lists of applicants for opportunities to take courses became an immediate necessity.

The tendency to improve quality of training was very manifest also. The action of the National Foundrymen's Association is significant. When this body was asked for assistance in studying the foundry industry, the reply of its leaders was "we will gladly do anything we can, if the purpose is to provide methods for thorough training of workers who shall know all the minutiae of their employment." Similar expressions from leaders in a dozen other lines showed that many thoughtful employers are being led to realize that workers can not profitably be employed on a single process as a general rule; that the method of production by specialists is useful only to a degree, not as a plan for the entire staff of an industry or even a single factory. Indeed, analyses of several large factories

known as "production organized" brought out the unexpected discovery that even in such establishments a large proportion of employees are all-round workers, and necessarily must be so qualified. To maintain the percentage of such workers practical training must be provided in the plants. The schools can not meet the need.

The vital necessity for a system of industrial training has been proved by the experience of the United States Training Service. The required elements are (1) a clearing house of methods and experience; (2) a corps of adequately trained experts to study special conditions, industry by industry, and to prepare from time to time up-to-date and sound methods which industries themselves may apply in their establishments; and (3) regular periodic gatherings of leading employers and leaders of employees, at which the broader aspects of the subject of industrial training may be discussed and the Government advised as to the improvement of industrial education in the interest of the employee, employer, and the public.

The experience of the service indicates that out of the 10,000,000 wage earners now employed in American factories, probably three-fourths are not properly qualified for their chosen occupations. This great body of seven and a half million workers to-day has no recourse for education suited to its needs. With workers stumbling along from day to day, oppressed with a sense of inferiority and hampered in ability to produce the goods the Nation needs and to earn the wages they must have to live, industrial unrest is not surprising. It is the duty as well as the privilege of the Nation to meet the need for industrial education by showing employers how to establish adequate training schools for their workers. No single remedy can be found for industrial unrest; its causes are complex. But no element in its causes is larger or more important than the feeling of denied opportunity that oppresses the worker who knows that his knowledge of his work is insufficient, and who charges that denial upon a society that ignores his situation and will not give him even advice and suggestions.

The sum of the findings of the United States Training Service is that labor wants an open way to self-development, a real opportunity for self-advancement, and that through a system of practical industrial training, intensive but thorough, lies more of such opportunity than in any of the present accepted types of education

INFORMATION AND EDUCATION SERVICE.

Origin and functions.—The Information and Education Service was created as a part of the War Labor Administration and was provided for through an appropriation of \$225,000 in the act making appropriations for sundry civil expenses for the fiscal year 1918.

The service itself was organized July 1, 1918. Its function was to disseminate information among employers and wage earners concerning the work performed by the various branches of the Department of Labor and to stimulate such morale among workers and employers as was necessary to increase production. This work was performed in various ways—through the press, public speakers, motion pictures, and posters.

The title of this service does not wholly describe its work. Strictly interpreted, the title would have included the functions of the Bureau of Labor Statistics also, for the work of that body is almost wholly educational and informative. The investigations of the Bureau of Labor Statistics are, however, largely fixed; in large part they are of a statistical, historical, or scientific nature. The work of the Bureau of Labor Statistics is of a permanent character and is carried on without regard to either war or peace. Through the Information and Education Service on the other hand it was proposed to handle the publication of matters of an informational and educational nature, such as that especially needed in the war emergency. Such diffusion of information could not have been obtained through the machinery of the Bureau of Labor Statistics nor through any extension of that machinery. It was necessary, therefore, to create a separate service for that purpose. While the functions of this service were not confined within extremely narrow limits, it had in view, nevertheless, the more immediate purpose of promoting sound sentiment in industrial plants or combating unsound industrial philosophies and the acquainting of the public with the national war labor program of the Government.

Organization.—For the purpose of subdividing the work of this organization five divisions were created. They are as follows:

1. Educational Division.
2. Information Division.
3. Economics Division.
4. Poster Division.
5. Industrial Plants Division.

Later there was added still a sixth division, during the period of reconstruction, known as the Division of Public Works and Construction Development.

The work performed by the Information and Education Service falls, as in the case of the other branches of the Department, into two periods—that included during the war and that period extending from the signing of the armistice to the end of the fiscal year.

WAR PERIOD.

Educational Division.—The purpose of the Educational Division was to assemble the news of the Department of Labor and to bring it to the attention of the public through a central agency. It was commonly known as the Publicity Division since its chief relations were with newspapers, magazines, and periodicals. The news as brought to the attention of the press had to do with labor and its allied topics, the cost of living, wages, working conditions, activities of trade-unions, etc. Its main purpose was to strengthen by the written word the morale of both worker and employer. In carrying out this purpose, however, no articles were prepared with a view to sending out propaganda on particular subjects or to give labor news a partisan or a prejudiced presentation. It acted wholly upon the theory that the morale could best be stimulated by making the truth available to all the people of the United States. Acting upon this theory it cooperated with the public press at all times so as to make accessible any information with regard to the war labor program of the Government. In carrying out this work the Educational Division formed interdivisional contacts with all the bureaus of the Department of Labor and interdepartmental contacts with all the other executive departments of the Government. Through these contacts it obtained much information of value to wage earners which would not otherwise have been disclosed and made available for public use many valuable economic reports which would otherwise have been made known only to a limited audience. A clipping service was established which covered most of the newspapers and magazines in the country.

Method of distribution.—Both telegraph and mail were used. In conducting its telegraph service this division received hearty cooperation from the principal war operations in distributing information to the newspapers not only of the United States but of foreign countries. Much cooperation was also received from the commercial organizations which sent material to regular clients in what is known to the trade as "boiler plate." Magazines were reached through the staff and special writers. The facilities of the division, however, were placed at the disposal of all such persons as were genuinely interested in securing information for magazine articles and stories. In addition many other special channels were used. Among these such institutions and organizations as the Carnegie Institute, the Military Intelligence, the Council of National Defense, Committee on Public Information, the American Educational Association, the Federal Board for Vocational Education, the Signal Corps of the War Department, Red Cross, etc.

Extent of distribution.—It is difficult to state exactly what circulation any particular item may attain. The method adopted by this

division for estimating the extent to which material was disseminated was an absorption check through clippings. The clipping service maintained by the division covered 150 papers, with a daily circulation ranging from 20,000 to 400,000, in cities ranging in population from 32,000 to 5,000,000. Based upon these figures an average circulation of approximately 12,000,000 readers per day was attained.

Information Division.—The Information Division was created to give effect to that portion of the President's memorandum of January 3, 1918, which provided for "the function of developing sound public sentiment." The basic thought back of this division is well stated in the words of the chairman of the War Labor Policies Board: "Production is vital to the winning of the present battle and for the winning of the war uninterrupted maximum production. Production means supplies for the fighting forces and production is wholly dependent upon labor. There may not be an adequate labor supply wisely distributed to meet the needs of the war industries; there must be sound and just conditions under which labor is employed." To bring home this statement to patriotic citizens generally and to employers in particular was the task assigned to the Public Speakers' Section. The tremendous turnover of labor supply added to the abuses occurring out of competing employment agencies as well as to the unwholesome and inadequate living conditions surrounding wage earners and their families in many of the large industries made it essential to increase the production, as well as in justice to the employees that the Government should do everything possible to better conditions. It was especially intended that employers should be made to realize their responsibilities along these lines. Consequently a small but efficient force of staff speakers was organized. In the period from July to December they made 378 addresses in 41 States. At least 100,000 representative business men heard their message. In addition the division secured capable volunteer speakers to the number of 400. They were constantly supplied with material as to policies and facts and were urged to seek in their home communities every suitable opportunity to encourage right relations in industry. Reports from 50 of these volunteers show they made more than 1,200 addresses. The general tenor of the messages delivered was as follows:

Maximum efficiency means no jumping from job to job, no idleness, no desultory work; but constant, determined, efficient effort every minute until the war is over. Every shift of a worker is a loss of efficiency that can never be regained. Investigate causes for shifting. Save man power over here.

The strain of the war must be borne by industry as well as by the soldiers in the Army. With 2,000,000 men overseas we must not only make up for their lost labor, but we must increase our prewar output. We must produce faster than war destroys. Chaos in the employment field must be replaced by system and efficiency. The

United States Employment Service has been created to replace competition with cooperation. The waste of labor turnover must be eliminated.

The Government will not allow the unpatriotic worker or unpatriotic employer to block necessary output. Workers and employers alike are assured a square deal when they apply to the Taft-Walsh Board. Let the War Labor Board decide the differences. In the meantime keep on showing the boys we are with them.

The "slacker" in industry, the firm which poaches on your help, the employer who offers alluring inducements to entice away employees will not be tolerated. The Employment Service will be glad to assist the employer in getting necessary workers, but he must not trespass on equal rights of other industries. Failure to heed requests from the War Labor Board will bring down upon the offending employer the condemnation of America.

The employer must realize as a leader in the Nation's industrial army that he and his workers are partners in the struggle for democracy and liberty. This cooperation must extend on the part of the employer to his working in close understanding with the United States Employment Service. To safeguard the rights of workers, employers must understand such basic labor policies as the eight-hour day in war industry; that for the sake of our industrial and economic future child-labor legislation must be upheld for the protection of our Nation and the workers of to-morrow; that where the necessities of our essential industries draw women into places left vacant by the men entering our ever-expanding Army the jobs must be suited to the women. Health and sanitary conditions must be made fit. Where jobs are by their very nature unsuited for women, women must neither be called upon nor allowed to volunteer. Where work is too heavy, machinery must simplify it. The guarding of these principles was committed to the Woman in Industry Service, while the Information Division spread the message.

There must be a new vision in industry. The dollar vision must disappear. Not what we have got but what we have done is what the public will demand of us. Our work must be our patriotic offering. The worker must feel not that he is merely enriching his boss, but that he is a real fighter in the cause of democracy. The road to victory lies through every citizen being determined that our Army must be fed the best and have the best guns. Money alone won't produce these things, but work will.

All engagements were made and details arranged by the Washington headquarters. Schedules were arranged for a number of speakers who undertook tours reaching every State in the Union. Staff representatives for the field were constantly kept informed through bulletins and correspondence.

Conference of speakers.—Responding to a call issued by the director of the division there was organized early in the fiscal year an inter-departmental conference of the different agencies of the Government using the spoken word as a means to increase morale and stimulating production of war material. Some eleven agencies of the Government were regularly represented at weekly conferences. The avowed objects of these weekly meetings were such matters as medial assistance in the exchange or borrowing of speakers, response to emergency calls or medial assistance where specialists were needed for concerted campaigns, exchange of information as to field conditions or reports upon sentiment in particular localities, cooperation in the regulation of policies of speakers, and advice to each other as to different schedules in order to avoid duplication or oversaturation in any one section

or district. This conference met regularly and was continued throughout the war. It was doubtless of great value in standardizing and correlating speakers' activities.

Motion pictures.—In furthering the policies laid down, early advantage was taken of the popularity of motion picture films to interest and instruct the public generally in industrial and labor policies so vital to increase war production. This work was conducted in cooperation with the Committee on Public Information and with the principal motion picture companies. The latter cooperated heartily in developing special films illustrative of the various war needs. One of the first produced was a film directing attention to the necessity for farm labor. Two films were sent out each week which dealt with news alone and many special feature pictures were developed for various bureaus of the Department of Labor, including one for the Bureau of Naturalization, which was part of a campaign in the public schools for Americanization. This section also served as a coordinating agency through the formal weekly conference in which were included representatives of nearly all Government departments utilizing films as a means of publicity or propaganda.

Industrial Plants Division.—The Industrial Plants Division was created July 25, 1918. Its function was to carry the message of the Information and Education Service to the workers in the industrial plants themselves by way of supplementing the work being done by the other divisions through the intricate mediums of the spoken word and the printed page. Its plan of organization contemplated functioning through war industries committees in individual shops or plants. Such of these committees as were formed consisted of five representatives of the employees and one representative of the employer. The function of the committee was to supervise patriotic work in the plants. They were not permitted, however, to assume under the pretext of war necessities any functions which were normally carried on by other committees or representatives either of workers or employers which had to do with the industrial relations between worker and employer and the working conditions of wage earners. Special attention was devoted by this division to the maintenance of production through the elimination of the personal causes of inefficiency. Absenteeism or unnecessary tardiness which tended to disorganize or retard production were in particular discouraged, as were also unprofitable shifting from one plant to another so as to create an unnecessary labor turnover and retardation of production as an economic weapon.

Through the committees above mentioned contacts were established directly with hundreds of thousands of workers. Weekly letters were written to each committee chairman keeping him informed as to the

progress of governmental work and advising him as to special governmental necessities. Particular emphasis was placed on the necessity for industrial peace and cooperating particularly with the Industrial Labor Service of the Department. Through the contacts hasty action on the part of the workers was frequently eliminated and grievances between them and their employers referred to the Labor Adjustment Service for such assistance as it was able to render or to the War Labor Board for final adjudication when conciliatory methods failed.

Division of Economies.—The work of this division was largely of an advisory character. It was particularly concerned with the labor policy of the several departments of the Government and with the assembling of information for the advice and assistance of the other divisions of the service. No attempt was made to build up or develop an independent division for administrative work. The division secured information concerning the policies set forth for the various bureaus of the Department of Labor, the purport of the decisions of the War Labor Board, the labor adjustments of the Shipping Board, the Quartermaster Division of the War Department, and like agencies involving industrial relationships. Memorandums summarizing these decisions and policies were prepared for the use of the other divisions of the service; in particular a typical analysis of the decisions of the War Labor Board was made as rapidly as decisions appeared. Some effort was made to compile the experience of Great Britain in its labor policy. Attention was given to the opinion of labor as reflected in labor papers, in order, if possible, to remove friction and forestall objections which might be made.

Poster Division.—The function of this division is amply indicated by its title. Beginning with a number of small posters distributed among a limited number of manufacturers in April, the Poster Division grew until in the month of November it was distributing upward of 700,000 posters monthly to business concerns throughout the country. The growth of the poster distribution is a proof of its value, for it must be recalled that this service was not granted to any firm except upon its own request.

RECONSTRUCTION.

Up to the time of the signing of the armistice the work of the Information and Education Service was devoted to getting the attention of the country fixed on war industries. Its subsequent efforts were to assist in restoring peace conditions as rapidly as possible. In particular the problem of unemployment was of vital importance. Prior to the armistice a severe shortage of labor had been felt. The release of workers in vast numbers from war industries was not accompanied by an immediate revival of normal peace-time industries. The result was widespread unemployment, temporary in nature it is

true, but nevertheless serious. It was particularly serious in view of the fact that the armistice was signed at the beginning of winter. One of the happy circumstances of history is the fact that the Civil War had ended in the spring and men stepped practically from the battlefield to the furrow. The armistice, on the other hand, was signed at the time when normal unemployment is most pronounced. Under such circumstances the Department turned as a means of relief to the stimulation of certain industries the product of which had been greatly diminished in volume as a result of the war. Notable among these were the related activities of public works construction and private building. It was, therefore, determined to focus on building in particular as a specific activity and to conduct a general campaign to stimulate buying so as to assist manufacturing in general. Hence, the last few months' activities of the Information and Education Service were used to stimulate building and buying. For the purpose of supervising such activities as related to building in its relation to better employment, a special division was created known as the Division of Public Works and Construction Development.

Special sections were organized to deal rapidly with the materials needed for a quick, effective campaign. Economists who were familiar with the conditions of the industry were summoned from various parts of the country. Under their supervision there was gathered a considerable amount of data on the forces and methods of supply of real estate loans, on building material, on wages of the building trades as compared with general wages, on the cost of living, on general conditions of labor in the building trades, and on the amount of private and public construction during the war years as compared with normal construction. The results of this investigation have been published separately. Under the supervision of the Statistical Section no fewer than 26,000 questionnaires were sent out to determine the amount of building suspended during the war and the reasons why the work was not resumed after the signing of the armistice. Upward of 7,000 replies were received showing a total amount of suspended building of nearly \$2,000,000,000. Of this amount more than two-thirds was for public works and the remainder private construction. A supplementary questionnaire in two parts dealing with real estate was also prepared. The purpose of this questionnaire was to collect reliable information reflecting the investigation status of typical improved properties throughout the country from 1914 to 1918, inclusive. It was sent to 125 secretaries of real estate boards throughout the country who in turn formed representative committees to collect the data.

As a means of carrying out the main purpose of the campaign, a section was instituted to interest the Nation in home owning. Campaigns were projected in 92 cities and actually organized in 78. Cor-

respondence, some of it leading to legal action without further cooperation on the part of the Department and concerning which no detailed information is on file, was conducted with organizations and officials of nearly 2,000 cities. A special section was organized to draft a bill for the promotion of a system of banks to be known as Federal Home Loan Banks. Conferences were held with many officials of building and loan associations in all parts of the United States and a bill was finally devised which met the requirements of the Secretary of Labor and the essentials set forth by building and loan associations. The bill as drafted has already been submitted to Congress. It involves the building and loan associations of the country, 7,269 in number, with a total membership of 3,838,612 and total assets of \$1,750,000,000, to advance loans more abundantly to home builders.

Effect upon building.—The exact amount of resumed building attributable to the campaign itself can probably never be determined, as it is impossible to separate that part which is due to stimulation from the part which would have occurred anyway. Nor is the Department concerned with making such a separation, although it believes that a great deal of the resumed work is in fact attributable to its efforts. The main consideration is that the work was done.

The most complete construction statistics available covered contracts let for engineering and building construction north of the Ohio and east of the Missouri, together with some adjacent area, containing four-sevenths of the population of the country. The contracts let for the first five months of 1919 (cost put up to 1919 price level) compared with the same months of 1915-16 were as follows:

Month.	1919	1915	1916
January.....	\$51,000,000	\$69,800,000	\$87,500,000
February.....	95,000,000	79,600,000	91,600,000
March.....	151,000,000	122,600,000	131,200,000
April.....	191,800,000	124,100,000	140,300,000
May.....		125,200,000	182,500,000

The total for March, 1919, exceeded the total for March of any other year but one, even with the cost of former years brought up to the 1919 price level. The totals for April and May exceeded the totals for April and May of all previous years even with costs adjusted to the 1919 price level. The revival of construction activity was more notable in the Middle West than in the East and in the smaller than in the larger cities.

Employers' Industrial Commission.—Early in the winter of 1918 it was evident that world industrial conditions were in flux. New groupings were in progress. Vast industrial reorganizations were in contemplation. It was felt on every hand that a knowledge of events

as they were progressing abroad would be of immense value to ourselves in handling problems then acute abroad and which might later arise in our own country. Of course, there was no assumption that a solution of any American industrial problem was to be found in merely following European precedent. Nevertheless, it was felt that a knowledge of events as they were then transpiring would be of great value, particularly in the case of Great Britain, because of the belief which is common in America that British industrial experiences have for many years been along the same paths as ours. While it is an arbitrary assumption that industrial history in the United States will necessarily flow in the same channel as that of Great Britain, it is nevertheless true that there is sufficient similarity in the commercial customs and industrial development of the two countries to warrant the statement that a knowledge of the experience in one is valuable in interpreting possibilities in the other.

Particular interest in foreign experience had been manifested by many employers who were in constant correspondence with the various bureaus and services of the Department. It was determined, therefore, to send to Europe a commission of representative employers for the purpose of ascertaining—

- (1) The attitude of employers toward problems of labor with special reference to their idea of the adjustment of disputes.
- (2) The views of the working classes and the attitude of the labor leaders.
- (3) The methods and plans of Governments to allay labor unrest.

The members of the commission were:

E. T. Gundlach, Chicago, Ill., chairman.

R. J. Caldwell, New York, N. Y.

Dorr E. Felt, Chicago, Ill.

William H. Ingersoll, New York, N. Y.

Eldon B. Keith, Brockton, Mass.¹

R. R. Otis, Atlanta, Ga.

The commission was accompanied by Dr. Royal Meeker, Commissioner of Labor Statistics in the Department of Labor, as economic adviser to the commission. Mr. B. M. Squires, a commissioner of conciliation in the Department, was appointed statistician. Two months were spent in travel and study. Among the subjects investigated were the shop-steward movement, the Whitley plan for joint standing industrial councils, unemployment insurance, health insurance, hours of labor, housing, minimum wage, compulsory arbitration, etc.

The report of the commission has been published as a separate volume and need not be further referred to in this report. The

¹ Commissioner Keith died while in London

following summary of its findings is appended, however, as it states in condensed form the substance of the report itself:

In conclusion, we submit the following findings:

1. Employers in Great Britain generally recognize the desirability of bargaining collectively with labor.
2. Employers nearly all agree that collective bargaining should always be undertaken between associations of employers and the regularly established well-organized trade-unions.

While many manufacturers welcome organizations of workmen in their factories (shop or works committees), they want to limit the activities of such bodies to purely local grievances, and decidedly desire that the committee members come under the discipline of their unions.

3. Most employers freely recognize the right of labor to organize; they regard organization as greatly contributing to the stability of industry. Some large manufacturers declare that they wish to see every workman within the unions, so that they must all come under organization control. Others feel that 100 per cent organization might lead to dangerous types of universal strikes and lockouts. The more conservative employers appear to make no effort to help along organizations of labor, merely dealing with such organizations when they appear on the scene.

4. Employees in Great Britain are divided in sentiment shading from those who want to maintain the trade-unions along the regularly established so-called "constitutional" lines to ultraradical socialists.

5. Employees are nearly a unit, however, in expressing opposition to the use of force. The most radical who desire "now" a complete overturning of the present social structure usually admit on close questioning that "now" may mean many years. They want to "start" now. Practically none appear to approve of a sudden change, as in Russia.

6. Employees of the ultraradical type look askance at collective bargaining and organizations of labor and capital. They freely express the view that they do not wish harmony between employees and employers, since harmony would help to continue the present system of society.

7. Employees of the more conservative type (and to your commissioners they appear to represent the vast majority of British workmen) are largely in accord with employers in the desire (1) to head off labor unrest at this period; (2) to strengthen the unions by holding members under control; (3) to increase production for the sake of the nation, workmen included—with no restriction on output except as it affects the health of the worker; (4) to leave control of business policies in the hands of those managing the business.

8. Government officials appear to be uniformly of the opinion that the Government should function in labor unrest only as an absolutely last unavoidable resort. On the other hand, they maintain the right of the Government to step in when necessary in order to protect public interests against minorities which try to force their terms upon the people.

9. In general the Government, and most employers and conservative employees, appear to be agreed:

That the spirit of cooperation between labor and capital is highly desirable.

That the spirit of conciliation is important for the benefit of the employer in stabilizing his business and for the benefit of the employee in preserving his regularly organized unions.

That in collective bargaining the right-minded employer will not attempt to return to the prewar industrial era, and that the right-minded employee will not attempt to crowd his demands to the point at which the stimulus for private business enterprise would disappear.

The spirit of a genuinely better new (and not novel) era is thus being fostered by widely varied elements of Great Britain's industrial system.

Conference of governors and mayors.—While the declaration of war by Congress in 1917 abruptly changed our legal status from one of peace to one of war, the actual adjustment of industry was gradual. Much of it, in fact, had already been accomplished, and many of our industries were already upon a war basis by reason of the fact that workshops and factories had been manufacturing munitions for upward of three years. In sharp contrast to this gradual transition was the abrupt change created by the signing of the armistice. Previous to the suspension of hostilities all the facilities of the Department had been exerted to their utmost to supply a serious labor shortage. With the release of large numbers of men from the Army, the shortage was converted into a surplus. The cancellation of war contracts left plants idle which had in many cases been driven at top speed for four years. Through the United States Employment Service the Department had endeavored in every possible way to assist men demobilized from the Army and persons thrown out of war employment. The basic situation, however, was of such a nature that a mere employment agency could do little more than minimize its evils. Temporarily, at least, there were more jobs than men. As has been indicated elsewhere in this report, the Department set about the stimulation of various projects for the purpose of creating buffer employment. Among the means suggested was the revival of the construction of public improvements. Unfortunately, however, very few of these projects were under Federal supervision, and any work to be accomplished along those lines must necessarily have been accomplished through the direction of State and municipal governments. For the purpose, therefore, of considering this important subject, as well as to make common concern of many of the other problems of reconstruction, there was arranged by the Information and Education Service; under the direction of the Secretary of Labor, a Conference of Governors and Mayors on March 3, 4, and 5, 1919. This conference was attended by chief executives or their representatives from 47 States, 22 governors attending in person. In addition there were present mayors from 184 cities. Representatives of municipalities were present from 41 out of the 48 States.

During the three-day session the delegates were addressed by the President of the United States and by six members of the Cabinet.

The conference adjourned on March 6, subject to the call of the Secretary of Labor to meet again early in 1920. One of the results of the conference was the appointment of an organization committee to draft a proposed constitution and by-laws for submission to all dele-

gates at the next conference, with the idea in view that some form of permanent league be adopted which would arrange to meet annually in Washington. The members of the committee of five were as follows: Mayor George L. Baker, of Portland, Oreg.; Mayor Frederick W. Donnelly, of Trenton, N. J.; Mayor W. Montague Ferry, of Salt Lake City, Utah; Mayor Daniel W. Hoan, of Milwaukee, Wis.; Mr. R. J. Wheeler, of Allentown, Pa.

It was further voted that the next conference should include the mayors of all cities of 25,000 population or over.

BUREAU OF INDUSTRIAL HOUSING AND TRANSPORTATION.

Organization.—The Bureau of Industrial Housing and Transportation was established in February, 1918. In July, under authority of an act¹ of Congress, the United States Housing Corporation was formed and took over the work previously begun by the bureau, with the exception of certain minor matters where it was deemed advisable to continue in the name of the bureau. An appropriation of \$100,000,000 was made available for the use of the Housing Corporation July 25, 1918. It was not possible to make contracts for the building of houses prior to that date. The period of greatest activity, therefore, of the United States Housing Corporation was between July 25 and November 11, 1918.

Purpose.—The establishment by the Federal Government of an agency to build houses for industrial workers was due to the nature of the war emergency. War industries to fulfill their contracts were forced to employ thousands, and some of them even tens of thousands of additional workingmen. The housing facilities of the cities in which these industries were located were as a rule quickly exhausted and new houses could not be built by private capital in sufficient quantity to meet the demand. Though unskilled laborers could in most instances be drawn from the community in which the war industry was located, skilled workers could not be so readily found and had to be attracted thither from all parts of the country. They could not be induced to come, or in any case would not stay on, unless there was a possibility of providing homes to which they could bring their families. As the draft increasingly removed the unmarried worker from the industrial field, the problem of housing the skilled married worker became more prevalent. As the labor turnover often ranged from 200 to 300 per cent a year, with attendant loss of efficiency and delay in the production of war materials, the problem of housing the industrial worker was one of the most urgent problems that the Federal Government was obliged to face.

The first essential was to secure accurate information concerning the housing needs of each of the industrial cities which complained of

¹ Public No. 149, 65th Congress, H. R. 10265, and Public No. 164, 65th Congress, H. R. 12280.

housing shortage and delayed war contracts. There was established in the Housing Bureau a Division of Preliminary Investigations, which subsequently developed into the Division of Surveys and Statistics. By means of careful questioning of the officers of the industrial plants which claimed a need of housing and a thorough study of the community within which these industries were located, the actual needs were quickly analyzed and recorded. By means of such investigation it was found that some cities claiming a housing shortage were suffering from no problem which could not be met adequately by a full utilization of local forces. On the other hand, there were more than 100 cities in which the problem of housing some class of the labor employed was already serious or was certain to become serious if workers were added to the existing force in the numbers contemplated by the industrial plants in question.

Utilization of existing facilities.—Had the war continued, the major resource would doubtless have been to transfer laborers engaged in less essential industries to war industries within the same community. War contracts could also have been distributed to a larger extent than they were during the first years of the war to those communities which had abundant labor and housing. But while these more fundamental plans were being perfected by the various contracting governmental departments, the immediate problem of housing the labor in centers already dangerously congested had to be met by means which could be put into operation immediately.

The first essential after ascertaining the housing needs of a community was to utilize to the utmost its existent housing facilities. The Homes Registration Division was, therefore, established and charged with the making of vacancy canvasses in all industrial communities reported as congested. Such canvasses covered every vacant house and flat, and where necessary every vacant room in occupied private dwellings of the city and its accessible suburbs. In cooperation with the Council of National Defense and local councils and other civic agencies a branch office of the United States Homes Registration Service was established, managed, and supported by local citizens, but reporting weekly to the Housing Bureau and executing its orders. Vacancy canvasses were thus made in over 100 cities, and 66 registries were established prior to the armistice, which had made 32,679 recorded placements of war workers up to November 16, 1918. By June 30, 1919, 71,481 persons were recorded as placed by the registries. Very considerable numbers of unrecorded placements were made, so that the above figures do not represent the actual accomplishments of this service. The homes in which these war workers were placed were in wholesome neighborhoods and as well adapted to the needs of the applicant as the circumstances of the community permitted. The local Homes Registration Committees also induced many householders to

repair dilapidated dwellings and put them on the market, or to improve idle rooms in their homes and to offer them to war workers, thereby creating abundant new housing facilities at no cost to the Federal Government.

Commandeering of vacant houses.—In some of the most congested cities large numbers of properties were held vacant either from a failure to appreciate the seriousness of the local need or from a desire to sell the property at an exorbitant price. In Washington, Philadelphia, Bethlehem, Pa., Erie, Pa., and Shelton, Conn., it proved necessary to commandeer such vacant properties, as the owners could not otherwise be induced to place on the market, in order to render them accessible to war workers. In Washington 141 properties were taken over in this manner, and in Bethlehem 143 houses were commandeered. By means of this practice, in Washington 1,340 persons were provided with comfortable homes at a cost much less than that which would have been involved in new construction.

Assistance in private construction of houses.—The local housing problem was also met in part by assisting local house building corporations in securing priority orders for the construction of houses. All requests for such assistance were examined by the Priorities Section of the Requirements Division, and where house building was needed to take care of workers in war industries steps were taken to secure priorities for materials, and to license these corporations to build under proper restrictions which would safeguard the worker, both as to rental and sale. By this means licenses were issued through the War Industries Board for about \$43,000,000 worth of homes for workers.

Solving the problem through transportation.—The saturation of the industrial community was accompanied where possible by providing for the transportation of war workers to accessible neighboring communities, and all vacant addresses in these neighboring communities were listed with the central office of the Homes Registration Service, or else a branch registry was established. Where there was abundant housing in neighboring communities but not available because of poor transportation, the Transportation Division made a survey and recommended a program for solving the housing problem through improved transportation. This was accomplished in some cases by rearrangement of train schedules, in others by loans to transportation companies to increase their rolling stock, trackage, or other facilities. Such loans were made on proper security and bore 5 per cent interest. Altogether loans to the amount of \$7,454,104.35 were contracted for, which have been reduced by \$1,533,383.88 since the signing of the armistice.

In other cases it proved desirable to run special trains from the war industry to a neighboring city where there was abundant hous-

ing. Fourteen such trains were arranged for at no expense to the Housing Corporation. Nine other trains were provided at special fares. Thus the provision of special express trains from shell-loading plants of the Amboy district to Asbury Park and Long Branch was a means of providing excellent housing for approximately 2,000 workers who commuted daily. Though the regular fare for this round trip was 42 cents the corporation arranged to have the fare reduced to 25 cents, absorbing the 17 cents differential.

Measures preceding house construction.—After thorough canvasses, comprehensive publicity, and appeals had opened up and utilized fully the available existing housing resources of industrial cities there was still in not less than 94 cities need for construction of housing accommodations for one or more classes of the industrial population.

When it was clear from the reports of the investigators that the problem could not be solved by saturation, transportation, or by any means short of erection of houses, a staff meeting was held, at which representatives of the War and Navy Departments were present, and a tentative allotment of funds was made to such community for the construction of houses. Then a real estate expert was sent to the community to report upon available properties and upon general values. Upon his return there would next go a committee on sites, composed of architect, town planner, engineer, and real estate expert for the purpose of choosing a specific site, taking into consideration all of the various factors affecting its location. The findings of this committee were reported to the staff meeting with recommendations. After the latter had been approved a special architect, town planner, and engineer were appointed for that project, and steps were taken through a real estate negotiator to secure land.

Acquisition of land.—Local appraisals of property were secured through the real estate board, the mayor, the assessor, the chamber of commerce, and the rotary club. The negotiator, armed with this information, undertook to secure the property from the owner at a reasonable price, and this price was submitted for approval to the president of the Housing Corporation. Altogether approximately 19,000,000 feet of platted land and about 2,800 acres of unplatted land were contracted to be purchased by the Housing Corporation, at a total cost of \$4,879,700. The corporation did not take advantage of the vendor, but was able to show him that it was informed as to actual values, and was, therefore, able to secure property at a fair price. The corporation tried to establish in the minds of the people the fact that the intention of the Government to purchase land should not be allowed to increase its value.

In 124 cases, to avoid delay in the acquisition of land, the bureau resorted to its power to requisition land. Altogether approximately

5,000,000 feet of platted land and 492 acres of unplatted land were requisitioned.

Planning the houses and environs.—The plans drawn by the local architect, town planner, and engineer were submitted to the Architectural, Engineering, and Town Planning Divisions to check with reference to standards established by the Housing Corporation and for suggestion. These three constituted a committee on design and worked in constant collaboration.

As the housing required was in practically every instance for skilled workers and not for day laborers—sufficient numbers of the latter class being available in practically every community—the houses had to be designed with reference to the requirements of skilled operatives and their families. The mode of living of the skilled workers was studied and the needs of their wives were successfully canvassed in order to ascertain what type of house would best meet their needs and wishes.

As local customs with reference to materials, planning, and equipment of houses for industrial workers vary materially throughout the country the types of houses required proved to be quite diverse, but it has been the aim of the Housing Corporation to consider the best prevailing local types and to provide housing which would be of good quality, but which would not deviate too widely from the types of houses to which local people were accustomed. It was possible to devise a relatively small number of house plans which could be duplicated in all the houses of the community. To avoid monotony, quite diverse exteriors were designed for houses of the same house plan in the attempt to design communities which would be attractive to the working man's family, and which would, therefore, increase his health and contentedness, and make it worth his while to stay in the industry for which he was working.

While the function of the architect was to design the house, the project town planner was responsible for the plan of roads and walks, subdivision into lots, the arrangement of buildings on the lots, the arrangement of recreation spaces, etc. The project engineer was charged with the provision of sewers, sewage disposal, lighting, water supply, grading of roads, sidewalks, etc.

Letting of contracts.—The completed drawings after approval were submitted to the Construction Division, which let the contracts. A list of responsible competing contractors was prepared and invitations to bid on the buildings were sent to those who were found to be reliable efficient, and financially able to handle work of this character. If contractors living within the vicinity answered these qualifications they were given opportunity to bid. The Requirements Division prepared an itemized estimate of the cost of the proposed buildings, which was used as a standard to check the bids. The materials were purchased through the Construction Division of the Army, which

fixed prices for the materials entering into construction. The contract was given to the lowest responsible bidder.

A few of the first contracts let were for a fixed price, but it was soon evident that fixed-price contracts could not be let except at exorbitant prices, because the contractor had to make allowances for very rapid increases in costs of materials and labor. It proved more economical, therefore, to apply a modification of the fixed-fee plan under which the Estimating Section of the Requirements Division of the Housing Corporation set a maximum fee which the corporation should pay, but in the contract it was agreed that if the final cost of the work exceeded this estimate the contractor would be penalized to the extent of one-half of his fee. If, on the other hand, he effected a saving under this estimate he could receive 25 cents on each dollar saved up to the limit of one-half of his fee. Some of the contracts did not contain the penalty feature, but all of the fee-basis contracts contained the provision for a fixed fee with a bonus for a saving in cost. The average contractor's fee for contracts over \$1,000,000 was only $2\frac{1}{2}$ per cent, on contracts of less than \$1,000,000 the average was about $3\frac{1}{2}$ per cent.

Field organization and procurement of materials.—A works superintendent was appointed to each project, with general authority over the work of the contractor and with the duty of seeing that the work conformed to the specifications. A field auditor and disbursing officer were also appointed. The Materials Procurement Branch of the Construction Division arranged for the acquirement of materials and for priority shipments through the War Industries Board. Labor difficulties on the project were handled through the Industrial Relations Division, which looked after the arbitration of difficulties and arranged for the health and comfort of the laborers. By winning the respect and loyalty of labor, the Housing Corporation was able to maintain its 10-hour day with Sundays off for contract work, although other enterprises had bid against it with a 12-hour day and Sundays included.

Effect of the armistice on the housing program.—During the week of the signing of the armistice, when it became clear that active warfare would probably end, the Housing Corporation ceased to let contracts and immediately abandoned 48 of its projects and curtailed 15 others, 22 being allowed to proceed as planned. The projects which were abandoned were those in which work had not been carried far, and in communities where there would be little probable peace-time demands for the houses which were in contemplation. The projects which were carried to completion were those in which construction work had been carried so far that it seemed probable that there would be less ultimate loss to the Federal Government through their completion than through their cancellation. They lay in communities

in which there was a permanent demand for the kind of housing facilities which were being provided and in which there was, therefore a probability that the houses could be disposed of when finished at a price sufficient to warrant their completion. Altogether 5,899 families are provided for by the amended program of the Housing Corporation. Dormitory accommodations were provided for 8,109 persons. The approximate final cost of the projects is \$35,000,000.

Rental policy.—The management of houses, apartments, and dormitories is in the hands of the Operating Division. For each project there is appointed an operating representative, who is responsible for the renting and the upkeep of the houses, and for the welfare of their occupants. For the present all houses are being rented. Rental prices have been fixed after careful study of the cost of construction, the prevailing rentals of the city, and the ability of the working men to pay. An attempt has been made to fix a price which will be fair to the working man and to the Federal Government, and a price which will not discourage private building enterprise within that same community, for it is recognized that as the Federal Government has built houses for emergency purposes only it would be poor policy for the Government in managing its properties to charge rents so low that private builders could no longer afford to build. The American working man does not want to be subsidized, and in our experience he has proved willing to pay a just price.

STATISTICS OF OPERATION.

On July 5, 3,515 of the houses and 159 of the apartments were reported occupied.

On the same date, 778 persons were reported as residents in hotels and dormitories constructed by the Housing Corporation at Quincy, Kittery Point, and Vallejo. The Government hotels for women war workers in Washington, authorized by Congress under the war housing act, approved May 16, 1918, are now complete. Before the creation of the House Corporation on July 25, 1918, working plans had been made and the contract was let on August 2. Construction began immediately, but numerous delays occurred, due to difficulties in securing building materials and equipment. The signing of the armistice and the consequent uncertainty of the future of those buildings was responsible for further delay.

In spite of all these obstacles, however, the first unit of 150 rooms was opened on December 19, 1918, four months and 17 days after the contract had been let. The various units for convenience are designated by letters of the alphabet, as A-B Building, C-D Building, etc., each consisting of two wings.

The 12 units are designed to accommodate 1,950 persons, including staff, and by July 15 they were 100 per cent occupied. There are

two dining rooms which seat 1,068 persons; there is a central power plant, a laundry, a small infirmary, and a small recreation hall. The dining room in the Plaza group opened on March 8, 1919, and has since been taxed to the limit. The dining room in the Capitol group was opened May. 19, 1919, in charge of a trained dietitian, who is expected to provide wholesome, palatable meals suitable for indoor workers. The Government employees who live in the residence halls pay \$45 a month for a room and two meals on work days and three meals on Sunday.

The resident units are designed to provide a maximum number of small single rooms supplied with running water, and having convenient access to bathrooms. There are general living rooms in each unit where guests may be received. The management is composed of trained specialists and the aim is to provide at a minimum expense comfortable living conditions for Government workers.

Disposition of materials.—Since the armistice, the major work of the Housing Corporation has consisted, first, in the completion of the houses in communities in which it had undertaken to build and in the operation of these houses when they have become ready for occupancy. The next most important function of the corporation has been to dispose of materials the curtailment of projects had rendered useless, and in the adjustment of claims against the corporation for damages incurred through the cancellation of contracts.

Reduction of personnel.—Coincident with the process of cancellation and salvage it was possible to eliminate the Division of Surveys and Statistics in the month of November and the Requirements Division in February, and to make continuous reductions in the personnel of each of the other divisions. On June 30, the Homes Registration and Information Division, the Industrial Relations Division, and the Town Planning Division were closed down. The Engineering Division was closed on the same date, and a small staff of engineers was transferred to the Construction Division to supervise the completion of street paving and public utilities and look after loans made to the municipalities. The Transportation Division has similarly curtailed its staff, but is forced to retain some men to supervise the loans and construction contracts for which it is responsible. The Committee on Requisitioned Houses turned over its work to the Operating Division on June 30, 1919. It had already returned to the owners all but 12 of the 141 properties requisitioned, without having incurred any damage suit. All of the houses which had been operated by the committee are now closed, those retained being leased to persons to provide rooms for war workers, subject to the supervision of the corporation and at a rental which is in no case less than the rental paid for the property by the corporation to

the owner. In many instances the rental provides a return which not only meets fixed charges but is amortizing the expenditures previously made for repairs. The Real Estate Division is completing its negotiations for the sale of properties acquired which are no longer needed.

Cancellation and modification of contracts.—The cancellation and modification of contracts has been handled through the contract branch of the Construction Division. By May 19, 1919, construction contracts to the extent of \$4,517,897.92 had been substantially completed, work was proceeding on contracts to the amount of \$27,843,226; contracts to the value of \$25,111,794.79 had been canceled at an approximate final cost of \$5,224,177.81. There were canceled without loss projects to the value of \$5,706,614.27, and projects to the value of \$275,000 were taken over by the Army. Contracts amounting originally to \$63,454,532.98 had been reduced since the armistice to a final cost of \$10,782,288.43, after all necessary allowance has been made for additional costs on the continuing contracts.

Adjustment of claims.—By May 19, 1919, the committee on adjustments had acted on claims of 36 different project cities, in addition to miscellaneous claims amounting to \$778,159.90. It had settled claims amounting to \$1,902,730.33 for the sum of \$1,146,641.32, representing a total saving of \$756,089.01.

PREPARATION OF THE FINAL REPORT.

In the process of planning and building houses in 26 different American cities, the United States Housing Corporation has gathered together from a variety of professions men possessing expert knowledge in their particular fields. These men before leaving the service of the corporation were asked to prepare statements of the more important phases of their work, which have been assembled and edited for the "final report to Congress covering in detail all the operations and transactions, under and by virtue of the terms of this act" which the Housing Corporation is required to submit "immediately after the declaration of peace."

The volume containing illustrations of the work of the Design Divisions with brief descriptive statement was prepared early while the persons who had directed these important activities were still with the Housing Corporation. These persons have in practically all instances now left the service of the corporation, and this volume has already been printed.

Disposal of the records of the Housing Corporation.—The large number of daily inquiries received by the United States Housing Corporation for information on varied aspects of this comprehensive subject have convinced the directors of this corporation that some

permanent provision should be made by the Federal Government for the utilization of the materials and the information which have been collected by the Housing Corporation and other branches of the Government which have been charged with work in this field. The almost universal shortage of housing accommodations has led to an exceptional amount of interest in this field, and has brought the subject intimately home to every chamber of commerce, manufacturers' association, and real estate board. It is apparent that the materials on this subject gathered for an emergency purpose should not be stored in some out of the way place, but that they should be rendered available for the service of the home builders of America.

COMMISSION ON LIVING CONDITIONS.

Origin and function.—The Commission on Living Conditions of war workers was appointed by the Secretary of Labor during October, 1918. Its members were: Mr. John R. Richards, Mr. J. Horace McFarland, Mrs. Eva W. White, Mr. John A. Voll, and Miss Edith Rockwood. The function of the commission was to learn where bad living conditions were a factor in retarding war production and to devise ways and means of improving such conditions.

History.—The first meeting of the commission was held on October 21, 1918. Immediately following the organization of the commission conferences were held with officials of the War Department, United States Housing Corporation, and other Government agencies for the purpose of making a preliminary survey. It was found as a result of this survey that recreation was one of the serious lacks in war industries centers. After consultation many organizations were interested in this subject. The Playground and Recreation Association of America was accordingly asked to undertake the coordination and stimulation of local agencies in communities in which large numbers of war workers were housed to meet the social recreational needs of the workers. As a result of conditions discovered by a survey of 31 cities, the War Workers' Community Service was organized in 30 of them. The limits of this report with regard to space preclude a detailed account of these activities. The best evidence of their value, however, is the desire for their continuance shown by the local communities.

Late in October reports reached the Department of Labor that Porto Ricans brought over by the Employment Service of the Department to work on construction of Army cantonments were not receiving fair treatment.

A personal investigation made by a properly authorized officer of the commission revealed the fact that Porto Ricans at Camp Bragg had been unintelligently supervised and unfairly treated. At Camp

Jackson, S. C., on the other hand, conditions were good. Upon the basis of these investigations steps were taken by the War Department to provide transportation for those who wished to go home and to improve the conditions of those who chose to remain.

Special work in Washington.—The excessive increase in the population of Washington, D. C., created an extremely serious situation during the winter which was only in part relieved by the exodus following the armistice. The Commission on Living Conditions was largely instrumental in securing the reopening of the Emergency Hospital to care for war workers suffering from influenza after the first epidemic had passed. Great assistance was given the War Camp Community Service in its preparation to care for recreational needs of Government employees. The National Recreation League was aided during the winter and was finally placed upon a firm basis by affiliation with the Federal Employees' Union. At the suggestion of the Commission on Living Conditions the Federal Social Service Workers were organized for the purpose of studying the working and living conditions of Government employees. Their first joint action was the presentation to the Committee on Public Buildings and Grounds of the House of Representatives of the need for Government hotels in Washington. Sentiment at that time was strongly for the abandonment of those projects, but the hearing resulted in the decision to complete and operate the buildings.

The Community Service.—As it was desirable to learn what services the Federal Government offered to communities, the commission had periodical conferences with representatives of the Bureau of Education, the States Relations Service, the Bureau of Markets, the Children's Bureau, and many other Government agencies which did work of a community character. The purpose of these conferences was to arrange a method by which the commission might solve the particular problems of communities without setting up a machinery of its own but by the assistance of already existing governmental facilities which needed only to be extended. Through the commission the city of Harrisburg was assisted in organizing a homes registration service to aid in the acute housing situation which became apparent after the war. In addition, on consultation with the commission, a bill was passed by the Pennsylvania Legislature which provided for an increased use of school buildings for community purposes.

Postwar activities.—The signing of the armistice necessarily changed the plans of the Commission on Living Conditions. Thereafter more attention was given to the formulating of national policies relating to housing and living conditions and relatively less to the concrete problems of particular places. Among the more important matters which received its attention was the attempt to unify the housing policies of the various governmental bodies which were building homes. Fre-

quent consultations were held with officials of the United States Housing Corporation, the Emergency Fleet Corporation, and the War Department Ordnance Bureau in relation to the completion, operation, and disposal of the properties under the jurisdiction of those bodies.

In January a conference was called to see whether the three agencies could not find means of developing a single housing policy to be applied to all properties of the Government. No common basis, however, could be found upon which the Emergency Fleet Corporation could work with the United States Housing Corporation. The War Department, however, agreed to assign its permanent properties to the United States Housing Corporation for operation and disposal.

The conclusion of the commission, with regard to the completion, operation, and disposal of the Government's housing and transportation properties are embodied in the "Program of Disposition of War Housing and Transportation Properties of the United States Government and for the Promotion of Community Housing Service after the War." This was prepared at my request for submission to the President of the United States.

Finances.—The Commission on Living Conditions was an adjunct to the United States Housing Corporation and financed by that body. It received an allotment from the housing funds of \$25,000. Of this, \$20,798.47 was expended, leaving an unexpended balance of \$4,201.53, which was returned at the end of the fiscal year.

WORKING CONDITIONS SERVICE.

Origin and functions.—The sundry civil appropriations act for 1918-19 carried an appropriation of \$45,000 to "enable the Secretary of Labor during the present emergency to carry on the work of war labor administration, including the working conditions of wage earners in the most essential war industries." This was in general compliance with the President's memorandum six months earlier which directed the Secretary of Labor to set up "machinery for safeguarding conditions of labor in the production of war essentials." Authority for performance of this function had existed, however, since the organization of the Department itself and is found in the organic act of the Department, which directs the Secretary of Labor to improve the working conditions of wage earners throughout the United States. The service was organized on July 1, 1918. More specifically, its duties were to examine into the matter of working conditions in war industries, to determine standards as to conditions which should be maintained in those industries, to adopt rules embodying such standards and explaining them, to determine the best means of securing the adoption and maintenance of such standards, and to cooperate with State authorities for the above purposes. The experience of the allies had demonstrated that a service of this kind was

essential in order to secure the largest possible output in munitions of war. Where no supervisory power over conditions of labor was exercised, health precautions were disregarded and the hours of labor extended, with a consequent reduction in health and efficiency. In the United States, it is true, the laws of the States provide certain standards of working conditions. The laws, however, were not uniform among the States and had in general been adapted to peace industries. Frequently they bore no relation whatever to the industries which sprang up since the war. A central authority, therefore, was necessary to investigate working conditions, if for no other reason than to advise the States as to the operation of their laws and to provide proper standards and conditions in Government contracts so as to secure the maximum war production.

WAR WORK.

Organization. —In dealing with working conditions as a war problem, the primary necessity was to avoid complicating an already complex situation. One of the principal reasons for authorizing the Secretary of Labor to act as War Labor Administrator was the necessity for securing a centralized authority responsible for standards and administration. Practically every production department of the Government had established a separate labor administration with consequent multiplicity of inspectors and standards. As a result of this decentralization of control, managements in industries were forced to submit to numerous inspections and were so confused by conflicting orders and standards that production was impeded. The first duty of the Working Conditions Service, therefore, was not to add to the already existing multiplicity of standards, but to secure cooperation of all production departments in furtherance of a common policy and program.

An analysis was therefore made to delimit the scope of the service. It could not, for instance, take cognizance of industrial controversies and those problems which are properly the field for agreements between management and employees. Its functions were considered as limited to the conditions of environment and processes that affect the health of the workers and their safety, and those personal relations between employers and employees that grow out of association for production purposes. Upon this theory an organization was planned to consist of a Division of Industrial Hygiene and Medicine, a Division of Labor Administration, and a Division of Safety Engineering.

In organizing the first of these it was necessary to take into consideration the proclamation of President Wilson of July 1, 1918, by which all Federal agencies dealing with health problems were instructed to make use of the facilities of the United States Public Health Service in order to avoid duplication of agencies. This division was there-

fore organized in cooperation with the Secretary of the Treasury, who was requested by the Secretary of Labor to detail personnel from the United States Public Health Service for this work.

Preliminary to its organization for field work, plans were under way to centralize control over the sanitary inspections of war production. These efforts resulted in the Division of Industrial Hygiene and Medicine being designated by the War Ordnance Department to be responsible for all sanitary and safety inspections. It was also made responsible for similar work in arsenals and all construction projects for the United States Housing Corporation.

The second division to be organized was that of Labor Administration. In this field, also, there were various Federal agencies organized to promote better employment policies and practices. Agreements were reached, however, to centralize these.

The last division to be organized was that of Safety Engineering. Owing to the fact, however, that the Division of Industrial Hygiene and Medicine had been made responsible for safety and sanitation in the Ordnance Department, there was included in the personnel a number of specialists in accident prevention and safety engineering. It was therefore possible to carry on considerable accident prevention work without the organization of a separate division for that purpose. The division was therefore really not organized until after the armistice was signed.

In addition to these other agencies, a committee was established in the early days of the organization to draw up a code of sanitary standards for the making of explosives. The development of the work of this committee revealed the fact that it was impossible to secure the adoption of general practices and policies without the voluntary cooperation of all concerned, and that it was impracticable to attempt under emergency conditions to enforce uniform standards that should be maintained without modification to meet the exigencies of war production. As a result of this experience it was determined that the most effective way to promote continuous betterment of working conditions was to advise specific managements how to make improvements and to furnish industries with information and service designed to meet their varying needs and conditions rather than to concentrate on development of industrial codes.

PEACE-TIME WORK.

This principle developed in war experience became the central principle of the Working Conditions Service in the peace program also. Since it possessed advisory power only, it necessarily had to depend upon the good will and cooperation of both employers and employees in order to secure results. It was determined, therefore, to develop a bureau whose function and duty it should be to furnish industries with information and suggestions for the betterment of

working conditions. This purpose had both a humanitarian and a business value. Production must be upon a paying basis. But when suggestions for such betterment are based upon scientific data and have a practical application to efficient production they have a strong appeal to management. Every employer is interested in eliminating unnecessary costs, but all know how much industrial health, safety, and good administration of the working force contribute to that end. But employers should not be expected to know what constitute the most desirable standards and policies. They properly determine their general policies upon working conditions and then employ specialists to secure desired results. The working out of better methods and practices requires the application of science to the industrial field.

The Working Conditions Service therefore offered to industries a consultant service of specialists in employment management, industrial relations, sanitation, ventilation, illumination, medical supervision and service, and accident prevention. Industries were advised that upon request they could secure information and advice in dealing with industrial problems. Coming at a time when industries were facing the critical period of transition from a peace to a war basis and were very slow to make changes because of financial and commercial conditions, the generous and hearty response which the announcement met is a very definite test of the practicability and desirability of the assistance. What the Department of Labor offered was not a welfare proposal but a business proposal based upon the conviction that good working conditions are good business. Good working conditions build up a spirit of good will toward the management and result in greater efficiency and increased production. High labor turnover means high labor costs of production.

Division of Industrial Hygiene and Medicine.—The function of this division was to protect and improve the health of those employed in industry and thereby facilitate production. The program dealing with industrial health recognized two fundamentals—control over physical working conditions is in the hands of the management, and the approval and cooperations of workers are necessary to make equipment and regulations effective. Both workers and management may appreciate the value of good health, but the problem of what constitutes a sanitary work place, what processes and materials are harmful to workers, involve scientific research and determination by specialists. To furnish this scientific information and advice is properly the function of the Government. The only effective and constructive method is to find out what conditions cause sickness and secure the elimination of those conditions. By such preventive methods industrial losses through sickness can be reduced and the field for curative methods minimized. The researches of the division, therefore, cover three main fields:

1. General hygienic conditions in industries in order to determine wherein existing conditions both within and without the plants comply with sanitary requirements.

2. Special occupational diseases and poisonings, to ascertain cause, effect, and prevention.

3. Physiological requirements of various occupations as the basis for developing methods of proper placement of workers with regard to physical ability.

Illustrations of the kind of work done are numerous. One of the most important and comprehensive investigations was the study of the pottery industry. This was done upon the request of both employers and employees. The survey covered plants in four States and included not only the study of conditions and processes but physical examinations of the workers themselves. The results so far obtained have brought about the granting of insurance to workers hitherto denied because of the alleged hazard in the dipping process. Many firms have sought information and the assistance of specialists has in addition been furnished. The service rendered varies from the perfunctory furnishing of routine information to the drawing up of complete programs, including diagrams and the layout of buildings and equipment. Six district offices were established in Philadelphia, New York, Cleveland, Pittsburgh, Chicago, and St. Louis. The United States Employees' Compensation Commission requested this division to assume advisory and in some cases direct charge of plants, whose employees were judged to come under the Federal compensation law. In accordance with this arrangement five separate investigations were made and supervision was assumed in 11 large plants. Aid was granted in improving or installing systems of medical and surgical relief in 19 establishments. Investigations were made at the request of the Ordnance Department and detailed reports furnished in the case of 11 establishments. Requests for service involving technical skill were received from 11 others. Reports were received from field offices on investigations of hygienic conditions in no fewer than 105 plants. Excerpts with recommendations from plant reports upon investigations made since September 1, 1918, were furnished to 78 concerns. On July 1 researches had been completed in the case of 27 establishments and were under way in the case of 5 others.

Division of Labor Administration.—The Division of Labor Administration was organized on the theory that handling human beings in industry with knowledge and understanding of their personalities and with due consideration of their feelings, prejudices, and ambitions constitutes the problem of personal relations in industry as distinguished from industrial relations, which cover the controversial subjects of the division of the product and control of industry, such as wages, hours, unionism, and so forth. The personal problem in

industry, the problem of administering the human element that goes into production, ought not to be a matter of industrial controversy. Like safety and sanitation it is a technical problem rather than a problem for capital and labor to fight about. The function of the Division of Labor Administration, therefore, was to find out the best methods of administering the labor forces in industry and to pass on this experience to other employers by spreading the knowledge of the best methods as widely as possible among industrial managers. To accomplish these purposes, the division organized its work to enable it to render three kinds of services to industry, which may be grouped under the headings (1) information, (2) standardization, and (3) consultation. Under the head of the first was collected all available information on employment and labor-management problems. Their purpose was to analyze and classify such information and serve as a national clearing house of information upon the subjects. Under the head of standardization, the Department aimed to develop standard employment practices based upon the most successful experience as disclosed by information collected. Model employment forms and record systems, standard methods of keeping employment statistics and improved methods of employment department organizations were prepared and distributed among employers. Under the third heading the methods and information worked out under the other two activities of the division were made effective to individual employers. Whenever an employer desired it, employment experts were detailed to make studies of his individual plant and to make recommendations for improvement. During the existence of the Working Conditions Service no fewer than 167 establishments were so served. The problems involved ranged from absence and tardiness of employees to such subjects as profit sharing, employees' representation, and shop management.

Division of Safety Engineering.—The function of this division was to reduce accident hazards in industry. These fall within three classes: (1) Those due to engineering defects; (2) those due to unavoidable trade risks; (3) those due to the human element. The first of these requires but the cooperation of the employer; the second must necessarily be dependent upon structural changes in industry; the third, however, is a classification within which the greater number of industrial accidents come. Therefore, an important part of the program was to reach workers and provide the information to secure intelligent safeguarding on their part. Its work has, therefore, been of necessity a work of publicity and information, although many requests have been received and much service has been rendered in particular industries by special studies.

Discontinuance of the service.—In spite of the fact that the Working Conditions Service fulfilled a vital need, it was necessary to discontinue the entire service at the conclusion of the fiscal year, because of

the failure of Congress to appropriate funds for its continuance. That this was necessary is a source of regret. The supervision of working conditions is one of the three principal purposes attributed to the Department by the very act creating it. The Department is convinced that sooner or later a resumption of this work must be undertaken. Care has therefore been taken to preserve the records and information gathered by the Working Conditions Service during its lifetime in order that these may be not only available to the general public in the meantime but that they may also be made part of a similar organization when public and legislative opinion again shall have become focused upon the necessity for a constructive organization of this character.

THE DEPARTMENTAL CABINET.

Origin and purpose.—As has been pointed out frequently before, almost the entire subject matter of the Department of Labor deals with human relations. In consequence, occasions for the determination of policy arise oftener and the problems entering into such policies when established are necessarily more complex than when the subject matter is merely financial or material. During the war the extension of the number of bureaus and services within the Department rendered necessary the creation of some means by which the heads of these bureaus and services might be kept constantly informed as to the activities carried on by the others and as to the central policies of the Department itself. A Departmental Cabinet was therefore instituted within the Department for the purpose of maintaining coherency in departmental policy, as well as to promote friendly intradepartmental relations.

Membership.—The members of the cabinet are the Assistant Secretary, the Solicitor (as Acting Secretary), the Chief Clerk, and the administrative heads of the various bureaus and services. The Director of Negro Economics is also a member by special designation. During the war there were also included the heads of the various war emergency services and boards. The acting head of the Department at the time of a meeting is the presiding officer of the cabinet and the Chief Clerk acts as its secretary.

ASSISTANT SECRETARY.

As stated in previous reports of the Department, the functions of the Assistant Secretary are to perform such duties as are required by law or are prescribed by the Secretary. Those required by law relate only to circumstances arising from the death, resignation, or absence of the Secretary; those prescribed by the Secretary may relate to any or all of the functions of the Secretary at any time and under any circumstances in the Secretary's discretion, and may be prescribed either generally or from time to time as occasion demands. The official activities of the Assistant Secretary during the period of this report are

so involved in the general work of the Department to which this report relates that a special report with regard to his activities would be impracticable.

News release.—Among the special assignments of the Assistant Secretary has been the duty of indicating what announcements submitted by the various bureaus from time to time may properly be transmitted to the public or to the press. The organization of a central agency for the release of news has been found necessary in order to protect departmental administration from premature, unwise, or unauthorized publications.

Making new opportunities for employment.—The Assistant Secretary has also been in charge of investigations within the Department for the purpose of formulating a departmental policy with regard to the relations of wage earners to public lands. In my annual report for 1915 my views with respect to the principles which should govern such relationships were set forth.

In view of the high and increasing cost of obtaining a living and the consequent effect upon the temper of a patient people, the need which I have previously emphasized is becoming urgent. This is the need of creating new employment through the deliberate attempt to render more accessible the very sources themselves upon which our living depends. These sources consist in the land—its soils, its ores, and its forests. Access to these sources, through ill-conceived means of handling the industrial process, has become badly clogged. And if we would make progress through constructive and not destructive channels, there must be a wide-open door between land and labor.

The investigation in this field, referred to in my report of last year, has been completed with respect to its preliminary stage. Mr. Benton MacKaye, formerly of the Forest Service (United States Department of Agriculture), was engaged to make a general survey of this field and to report upon the possibilities of developing a national policy of land using that would attain the ends of greater accessibility. His report, "Employment and Natural Resources," has recently been issued by the Department. As part of the general investigation there has been published also a report by Mr. Leifur Magnusson, of the Bureau of Labor Statistics, on the "Disposition of the Public Lands of the United States with Particular Reference to Wage-Earning Labor."

Unfortunately, this important piece of investigation, through lack of appropriations, has had to be terminated.

This land policy, which I have been recommending since 1915, applies now with regard to our returned soldiers and our other citizens in the reconstruction to follow the coming of peace. It is embodied in part, but only in part, in what has been called the "back to the land" movement. In this movement the need is emphasized

of going back to the *agricultural* land. This of course is of primary importance and in previous reports I have mentioned the principles which should, in my opinion, guide us in furthering such a development. Agriculture should be carried on through the community unit, not the isolated farm unit; the farm community should be linked closely with the local city market through the direct postal motor truck rather than the roundabout railway car; above all the individual land tenure should be taken off the present basis of unearned profits and placed upon that of actual use.

But there are other ways of going "back to the land." Agricultural soil forms only one of the sources of life. The powers dormant in our coal seams, oil pools, and falling waters form another primary source. The structural materials in our hidden ores and our growing forests form still another. The coal, ores, and powers in our remaining western public lands should be held under public control. They should then be developed through public means and in a way to make them far more accessible to labor and the people's use than the deposits (once free) which form the basis of our present coal and steel industries. Could a policy of public accessibility have been applied on the coal lands of Pennsylvania and the iron lands of the Messabe Range the troubles now besetting these basic industries could never have arisen.

Proposed legislation designed to carry out the recommendations on this line in my report of last year was introduced last winter in the Sixty-fifth Congress by Representative M. Clyde Kelly of Pennsylvania. At a hearing on his measure, held in January before the House Committee on Labor, the Assistant Secretary appeared for the Department, and indorsed the legislation in principle. This proposed legislation was later introduced, in extended and improved form, in the Sixty-sixth Congress.

A program of land accessibility would require a vast amount of development work. To do this work Representative Kelly, in his proposed law, has provided for a public "construction service" to be handled in accordance with modern standards of labor and labor organization. This is an important means for the practicable carrying out of the program, and could in itself be made an opportunity for creating permanent employment which would be profitable alike to the worker and the public. Such a service would constitute also a means of preparedness against future emergencies of unemployment. This service should be established without delay.

Deferred classification of departmental employees.—The Assistant Secretary was also in charge during the period of the war of departmental requests to local draft boards for deferred classification of departmental employees. The calling of large numbers of able-bodied men to military service seriously affected the personnel of the Department and its various bureaus. Notwithstanding the needs of the

Department, its policy was not to ask for deferred classification of any person who could be replaced without substantial loss in efficiency. The practice was to act only upon the request of the immediate superior of the person for whom classification was asked. Such requests were referred to a departmental committee for recommendation. This committee examined carefully into the circumstances surrounding each request and made recommendations to the Assistant Secretary as to the necessity and desirability of his approval. The Assistant Secretary then determined the departmental policy in individual cases, upon the basis of the evidence developed by the committee and the reports it submitted.

SOLICITOR.

Functions.—The Solicitor is assigned to this Department by the Department of Justice. He is its chief law officer and legal adviser. By Executive order of February 16, 1918, in accordance with section 179 of the Revised Statutes he is also authorized and directed to perform the duties of Secretary of Labor during the absence of the Secretary and the Assistant Secretary, his official designation in this connection being Acting Secretary.

Report.—The Solicitor makes the following summary of activities in his office for the fiscal year ended June 30, 1919:

Legal opinions rendered, formal.....	48
Contracts and leases examined, approved, or disapproved.....	1,368
Contracts and leases drafted, redrafted, or modified.....	17
Bonds, official, examined, approved, or disapproved.....	10
Bonds, contract, examined, approved, or disapproved.....	16
Bonds, alien immigrants, examined, approved, or disapproved.....	1,472
Miscellaneous matters embracing everything submitted for advice or suggestion of the Solicitor, or for the formulation of departmental action, not included in the foregoing items.....	371
Total.....	3,302

APPOINTMENT DIVISION.

General conditions.—The work of the Appointment Division was necessarily increased during the period of the war. The natural increase of the work of the Department to which must be added many problems caused by the war activities and the period of readjustment following the signing of the armistice placed a very heavy strain upon the division. During the war period the Government service was greatly handicapped by being obliged to employ persons without proper qualifications to fill positions made vacant either by enlistments or the draft. In many cases it was practically impossible to obtain persons of the requisite skill. Many of those employed had absolutely no experience and in many instances were unreliable. Another element which lessened the general efficiency of the services was that large numbers of the experienced employees, with many

years of efficient service to their credit were kept at low salaries on account of the laws which limited the number of and compensation attached to the statutory positions in the various bureaus of the Department. Being paid from statutory rolls they had to be kept at the lower salaries and when new, inefficient, and inexperienced employees were brought in at much higher salaries these efficient but low-salaried workers were called upon to coach and teach them and supervise their work. Much commendation is due these old employees. Many of them could have gone into private work at increased compensation; but their loyalty to the Government kept them at the work which they felt was most important to their country. Had many of the old employees of the Government accepted the better positions which were theirs for the asking the conditions in the service would have been very much worse than they were.

Entrance salaries.—There should be no position under \$1,000 per annum in the Department save those of part-time employees, such as charwomen, etc., and those now existing should be so graded up that the present \$1,800 position would pay at least \$2,250. Under the present system Congress has created a number of positions ranging from \$720 to \$1,800 per annum. The low-salaried positions greatly exceed in number the higher salaried ones, and this should be reversed; or, at least, the number of higher salaried places should equal that of the lower. This would afford an opportunity for the lower salaried persons to get deserved promotions. Under the present system, with a schedule embracing possibly four positions in the \$1,800 per annum and other high-grade salaries and a hundred or more in the lower salaried grades it will be admitted that there are few opportunities for the lower salaried employees to advance. The chances of vacancies in the higher grades are necessarily limited by reason of the small number of such places.

Officials and employees.—There was an increase in the force of the Department of 1,975 employees as against 2,376 for the year ended June 30, 1918. The statutory positions were increased from 428 to 463, and this increase was mainly in the Bureau of Labor Statistics, the force of that bureau being augmented by an addition of 23 employees out of a total of 35 new positions for the entire Department. The administrative organization of the Department, that is, the working force of the Office of the Secretary, including the Chief Clerk's office, the Disbursing Office, the Division of Conciliation, the Division of Publications and Supplies, the Appointment Division, and the mechanical, watch, and labor forces of the Department, received only 9 additional positions.

There is an apparent increase in the nonstatutory positions to the number of 1,723. This increase was mainly in the United States Employment Service. A very large majority of these employees are paid only a nominal salary, however, being State, county, or

municipal officers cooperating with the Employment Service. The total increase in all positions, statutory and nonstatutory, including those receiving a nominal salary, is 1,975 over the year ended June 30, 1918. As compared with the previous year this increase is slightly over 82 per cent.

Total number of officials and employees in Department of Labor, July 1, 1919.

Bureau or office.	Statutory.	Non-statutory.	In District of Columbia.	Outside District of Columbia.	Total July 1, 1919.	July 1, 1918.	Increase(+) or decrease(—) during year.
Office of the Secretary.....	118		118		118	109	+ 9
Commissioners of Conciliation.....		79		79	79	60	+ 19
Labor Statistics.....	135	96	155	76	231	160	+ 71
Children's Bureau.....	76	100	75	100	175	270	— 95
Immigration.....	65	1,772	70	1,767	1,837	1,716	+ 121
Naturalization.....	70	139	70	139	209	271	— 62
United States Employment Service.....		3,704	117	3,587	3,704	1,809	+ 1,895
Woman in Industry Service.....		17	17		17		+ 17
Total.....	463	5,907	622	5,748	6,370	4,395	+ 1,975

Changes in personnel.—The following tables indicate the number of changes in personnel throughout the executive offices and bureaus of the Department during the fiscal year ended June 30, 1919:

Appointments in the Department of Labor, fiscal year ended June 30, 1919.

Bureau or office.	Permanent.				Temporary.	Grand total.
	Competitive.	Ex-cepted.	Un-classified.	Total.		
Office of the Secretary.....	39		10	49	42	91
Commissioners of Conciliation.....					95	95
Labor Statistics.....	47		2	49	1,343	1,392
Children's Bureau.....	76			76	400	476
Immigration.....	449	8	17	474	582	1,056
Naturalization.....	131			131	312	443
United States Employment Service.....	321	40		361	7,440	7,801
Bureau of Industrial Housing and Transportation.....	1			1	230	231
National War Labor Board.....	5			5	375	380
War Labor Policies Board.....	2			2	124	126
Information and Education Service.....					302	302
Investigation and Inspection Service.....					64	64
Woman in Industry Service.....	4			4	26	30
Training and Dilution Service.....	2			2	154	156
Working Conditions Service.....	3			3	17	20
Labor Adjustment Service.....					1	1
Total.....	1,080	48	29	1,157	11,507	12,664

There was a total of 12,664 appointments during the year. This number includes every case in which an appointment certificate was issued. It will be observed that of this number there were 11,507 temporary appointments. In many cases this figure includes short-term appointments, a large number of which were extensions, each action being considered an appointment, due to the fact that the same procedure was required in making an extension as in issuing a new appointment.

Separations and changes.—There were 6,150 separations from all classes of positions. This figure indicates a very heavy turnover. However, the records show that a large number of employees were appointed for a short temporary period, and necessarily “separated” at the conclusion of the term. Many of these employees were appointed and separated five or six times during the year.

Separations and miscellaneous changes in personnel.

Bureau or office.	Separations.					Grand total.	Miscellaneous changes.
	From permanent positions.				From temporary positions.		
	Competitive.	Excepted.	Unclassified.	Total.			
Office of the Secretary	36		4	40	16	56	152
Commissioners of Conciliation					47	47	90
Labor Statistics	17			17	546	563	641
Children's Bureau	27			27	206	233	529
Immigration	202		8	210	314	524	1,432
Naturalization	32			32	136	168	355
United States Employment Service	436			436	3,229	3,665	9,825
Bureau of Industrial Housing and Transportation					250	250	43
National War Labor Board	3			3	245	248	551
War Labor Policies Board					124	124	105
Information and Education Service					174	174	165
Investigation and Inspection Service	9			9	10	19	105
Woman in Industry Service	3			3	14	17	21
Training and Dilution Service	13			13	47	60	129
Working Conditions Service					2	2	22
Labor Adjustment Service							2
Total	778		12	890	5,360	6,150	14,167

Transfers.—In the matter of transfers from the Department of Labor to other Departments and from other Departments to the Department of Labor, the figures show only slight changes, there being a total of 30 coming into the Department from other establishments and 22 going from this Department to other establishments.

The table following shows the number of transfers from and to the Department during the fiscal year ended June 30, 1919:

Bureau or office.	From—									To—			
	Government Printing Office.	Department of Commerce.	Department of Agriculture, culture.	Post Office Department.	War Department.	State Department.	Treasury Department.	Navy Department.	Department of Justice.	Total.	Treasury Department.	Government Printing Office.	Post Office Department.
Office of the Secretary.....	1	2	1							4			
Labor Statistics.....				1						1			
Children's Bureau.....					1					1	16		16
Immigration.....			1		2	1	2	6	5	17			
Naturalization.....				1						1			
United States Employment Service.....		2		1	1		2			6	4	1	6
Total.....	1	4	2	2	5	1	4	6	5	30	20	1	22

DISBURSING CLERK.

Functions.—The disbursing clerk prepares requisitions for public funds from appropriations for the Department. He also pays its obligations and does the general accounting of the Department. Naturalization fees and moneys received by the Secretary of Labor from aliens in lieu of bond are accounted for by him.

Appropriations.—For the fiscal year ended June 30, 1919, the appropriations by Congress to the Department and its services and the allotments made by the President to the Department from the appropriation of \$100,000,000 provided for the national security and defense by the deficiency act approved April 17, 1917, were as follows:

Salaries, Office of the Secretary of Labor.....	\$128,200.00
Salaries and expenses, commissioners of conciliation.....	200,000.00
Contingent expenses, Department of Labor.....	50,496.79
Contingent expenses, Department of Labor (certified claims).....	14.81
Contingent expenses, Department of Labor, 1918.....	10,000.00
Contingent expenses, Department of Commerce and Labor (certified claims).....	2.76
Rent, Department of Labor	24,000.00
War Emergency Employment Service.....	5,772,000.00
Advanced transportation, United States Employment Service, 1918-19.	250,000.00
National security and defense, Department of Labor:	
Cost of living.....	325,000.00
Work of Children's Year.....	150,000.00
Investigation of child labor.....	100,000.00
Industrial surveys.....	300,000.00
Passport permits.....	500,000.00
Mediation.....	560,000.00
Labor allotment.....	10,000.00
War Labor Administration:	
Conciliation.....	326,393.11
Information and Education Service.....	225,000.00
Investigation and Inspection Service.....	300,000.00
Personnel.....	15,000.00
Secretary's Office.....	110,000.00
Training and Dilution Service.....	150,000.00
Woman in Industry Service.....	40,000.00
Working Conditions Service.....	45,000.00
Printing and binding (all services).....	150,000.00
Salaries, Bureau of Labor Statistics.....	172,960.00
Miscellaneous expenses, Bureau of Labor Statistics.....	70,000.00
Library, Bureau of Labor Statistics.....	300.00
Salaries, Bureau of Immigration.....	88,340.00
Expenses of regulating immigration.....	2,450,000.00
Immigration Station, Ellis Island, N. Y.....	170,000.00
Expenses of regulating immigration (advertising).....	11.85
Expenses of regulating immigration (certified claims).....	122.15
Refunds:	
Cunard Steamship Co. (Ltd.).....	75.00
Hartfield, Solari & Co.....	160.75
Scandinavian-American Line.....	70.50
Head tax.....	648.00

Payment to Mauro Fierro.....	\$125. 00
Salaries, Children's Bureau.....	102, 040. 00
General expenses, Children's Bureau.....	94, 000. 00
General expenses, Children's Bureau (certified claims).....	101. 00
Enforcement of the child-labor law.....	125, 000. 00
Investigation of child welfare, Children's Bureau.....	72, 120. 00
Salaries, Bureau of Naturalization.....	97, 010. 00
Miscellaneous expenses, Bureau of Naturalization.....	275, 000. 00
Miscellaneous expenses, Bureau of Naturalization, 1918-19.....	400, 000. 00
Miscellaneous expenses, Division of Naturalization (certified claims).....	. 49
Naturalization fees, publishing of citizenship textbooks, Bureau of Naturalization.....	29, 310. 36
Increase of compensation, Department of Labor.....	221, 868. 43
Printing and binding.....	130, 000. 00
Total.....	14, 240, 371. 00

Expenditures.—Expenditures, arranged according to items of appropriation, are as follows:

Office of the Secretary:

Salaries, Office of the Secretary of Labor, 1918.....	\$4, 449. 10
Salaries, Office of the Secretary of Labor, 1919.....	116, 572. 78
Contingent expenses, Department of Labor, 1917.....	2. 00
Contingent expenses, Department of Labor, 1918.....	57, 183. 37
Contingent expenses, Department of Labor, 1919.....	106, 954. 95
Salaries and expenses, commissioners of conciliation, 1917.....	1. 91
Salaries and expenses, commissioners of conciliation, 1918.....	8, 672. 84
Salaries and expenses, commissioners of conciliation, 1919.....	173, 781. 37
Rent, Department of Labor, 1918.....	2, 000. 00
Rent, Department of Labor, 1919.....	22, 000. 00
War Emergency Employment Service, 1918.....	6, 552. 44
War Emergency Employment Service, 1919.....	86, 119. 22
Housing for war needs, 1918-19.....	45, 913. 03
National security and defense, Department of Labor.....	228, 629. 17
President's Mediation Commission.....	\$1, 270. 18
Productive labor.....	173, 538. 75
Housing.....	3, 544. 23
Mediation.....	50, 276. 01

National security and defense, Department of Labor, 1919 (mediation).....	487, 909. 06
War Labor Administration, 1919:.....	856, 955. 47

Secretary's Office.....	\$79, 724. 66
Conciliation.....	294, 806. 16
Personnel.....	4, 508. 05
Information and Education Service.....	175, 749. 02
Woman in Industry Service.....	32, 130. 42
Working Conditions Service.....	29, 318. 23
Training and Dilution Service.....	116, 390. 94
Investigation and Inspection Service.....	121, 176. 43
Printing and binding.....	3, 151. 56

Increase of compensation, Department of Labor, 1918.....	5, 853. 48
Increase of compensation, Department of Labor, 1919.....	210, 410. 10

Total.....	2, 419, 960. 29
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Bureau of Labor Statistics:

Salaries, Bureau of Labor Statistics, 1918.....	\$5, 934. 96
Salaries, Bureau of Labor Statistics, 1919.....	157, 454. 48
Miscellaneous expenses, Bureau of Labor Statistics, 1917.....	4. 80
Miscellaneous expenses, Bureau of Labor Statistics, 1918.....	9, 787. 76
Miscellaneous expenses, Bureau of Labor Statistics, 1919.....	56, 210. 76
Library, Bureau of Labor Statistics, 1917.....	2. 32
Library, Bureau of Labor Statistics, 1918.....	414. 50
Library, Bureau of Labor Statistics, 1919.....	234. 41
National security and defense, Department of Labor, cost of living.....	13, 665. 69
National security and defense, Department of Labor, 1919.....	457, 414. 50
Survey of cost of living.....	\$299, 255. 55
Industrial surveys.....	158, 158. 95
Total.....	<u>701, 124. 18</u>

Bureau of Immigration:

Salaries, Bureau of Immigration, 1918.....	3, 163. 18
Salaries, Bureau of Immigration, 1919.....	76, 624. 40
Expenses of regulating immigration, 1917.....	517. 57
Expenses of regulating immigration, 1918.....	87, 608. 40
Expenses of regulating immigration, 1919.....	2, 471, 685. 59
Expenses of regulating immigration, 1918-19.....	249, 628. 90
Expenses of interned aliens, 1917-18.....	62, 783. 06
Immigration Stations—	
Ellis Island, New York.....	210, 553. 36
Philadelphia, Pa.....	4, 550. 00
National security and defense, Department of Labor, 1919, passport permits.....	331, 276. 82
Payment to Mauro Fierro.....	125. 00
Refunds—	
Cunard Steamship Co. (Ltd.).....	75. 00
Hartfield, Solari & Co.....	160. 75
Scandinavian-American Line.....	70. 50
Total.....	<u>3, 498, 822. 53</u>

Children's Bureau:

Salaries, Children's Bureau, 1918.....	4, 393. 79
Salaries, Children's Bureau, 1919.....	91, 560. 15
General Expenses, Children's Bureau, 1917.....	5, 350. 00
General Expenses, Children's Bureau, 1918.....	50, 504. 78
General Expenses, Children's Bureau, 1919.....	80, 549. 72
Enforcement of child-labor law, 1918.....	11, 133. 86
Investigation of child welfare, 1918.....	16, 794. 60
Investigation of child welfare, 1919.....	60, 546. 77
National security and defense, Department of Labor, 1919.....	153, 637. 48
Work of Children's Year.....	\$68, 917. 74
Investigations, child-labor.....	84, 719. 74
Total.....	<u>474, 471. 15</u>

Bureau of Naturalization:

Salaries, Bureau of Naturalization, 1918.....	3, 499. 01
Salaries, Bureau of Naturalization, 1919.....	83, 919. 55
Miscellaneous expenses, Bureau of Naturalization, 1917.....	3. 66
Miscellaneous expenses, Bureau of Naturalization, 1918.....	21, 588. 39

Bureau of Naturalization—Continued.

Miscellaneous expenses, Bureau of Naturalization, 1919.....	\$247, 809. 44
Miscellaneous expenses, Bureau of Naturalization, 1918-19.....	327, 506. 73
Naturalization fees, publishing of citizenship textbooks, Bureau of Naturalization.....	29, 310. 36
Total.....	713, 637. 14
Grand total.....	7, 808, 015. 29

In addition to disbursements by the disbursing clerk, the following expenditures in behalf of the Department were specifically made:

By special disbursing agents for—

Housing for war needs.....	\$217, 444. 82
United States Employment Service.....	5, 568, 946. 61
Bureau of Labor Statistics.....	3, 332. 27
Children's Bureau.....	6, 571. 38
Bureau of Immigration.....	38, 807. 18
Bureau of Naturalization.....	885. 75
War Labor Administration (Information and Education Service).....	4, 037. 45
Claims settled by the Auditor for the State and Other Departments....	410, 236. 62
Total.....	6, 250, 262. 08

Miscellaneous receipts.—The following receipts from miscellaneous sources have been recorded during the year:

Bureau of Negro Economics:

Gratuitous refund from private concerns account of travel.....	\$20. 26
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Woman in Industry Service:

Gratuitous refund from private concerns account of travel.....	80. 37
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Bureau of Immigration:

Head tax.....	\$990, 419. 00
Fines.....	52, 864. 00
Exclusive privileges.....	512. 00
Telephone service.....	1, 893. 45
Forfeiture of bonds.....	6, 099. 50
Court costs.....	77. 95
Government property.....	351. 35
Total.....	1, 052, 217. 25

Bureau of Naturalization:

Naturalization fees.....	\$387, 957. 59
Interest on naturalization fees.....	162. 09
Total.....	388, 119. 68

Miscellaneous:

Proceeds of sale of Government property.....	14, 589. 23
Total.....	1, 455, 026. 79

Unexpended balances.—In accordance with the act of Congress of June 20, 1874 (18 Stat. L, 110, 111), the following unexpended balances of appropriations were covered into the surplus fund of the Treasury Department June 30, 1919:

Library, Bureau of Labor Statistics, 1917.....	\$22. 68
Contingent expenses, Department of Labor, 1917.....	48. 00
Salaries, Bureau of Immigration, 1917.....	3. 71
Miscellaneous expenses, Bureau of Naturalization, 1917.....	24. 25
Total.....	98. 64

THE BUREAUS.

BUREAU OF LABOR STATISTICS.

Origin and history. —The Bureau of Labor Statistics, the oldest of the bureaus in the Department of Labor, was authorized by an act approved June 27, 1884, nearly 30 years before the creation of the Department. Under this act a "Bureau of Labor" was created in the Department of the Interior.

It was formally organized January 1, 1885. In 1888 this Bureau of Labor was separated from the Department of the Interior and made an independent department, under the title "Department of Labor," with a Commissioner of Labor as its chief, who, however, not being of secretarial rank, was not a member of the President's Cabinet.

In 1903 this "Department of Labor" was placed under the Department of Commerce and Labor, as the Bureau of Labor, its original designation. It became a part of the Department of Labor, under the title of the Bureau of Labor Statistics, on the creation of the Department in 1913.

The organization of the Bureau of Labor Statistics was the first response to an appeal by wage earners, urged for more than 20 years throughout the country and in Congress, that there be created a department in the Federal Government to look after their interests. The Bureau of Labor Statistics is the nucleus around which the Department of Labor has been built up. Its functions are now and always have been almost wholly statistical and educational.

The Monthly Labor Review. —To convey more accurately the nature of the publication, the name of the Monthly Review, established by the bureau in 1915, was changed with the July, 1918, issue to the Monthly Labor Review.

In the four years of its publication this magazine has proved its usefulness as a medium for the dissemination of authoritative labor news, and its scope has been greatly enlarged. The Review carries each month articles on the current work of the Bureau of Labor Statistics and summaries of the reports and activities of all other Government agencies, both Federal and State, which have to do with labor. In addition to the monthly presentation of statistics of immigration and of a summary of the conciliation work done by the Department, reports of the work of the various State labor bureaus and other State agencies dealing with labor and complete summaries of the important new legislation, court decisions, and administrative orders affecting labor, are given to the public promptly. Special attention is given to up-to-date information on wholesale and retail prices and cost of living; wages and hours of labor; minimum wage; women in industry; employment and unemployment; labor turnover; conciliation, mediation, and arbitration; strikes and lockouts; collective

bargaining; employees' representation; cooperation; profit sharing; labor organizations; industrial accidents; industrial poisons and diseases; workmen's compensation and social insurance; labor legislation; vocational education; rehabilitation of injured men; housing and welfare work. The various reconstruction programs, both domestic and foreign, and various phases of reconstruction work receive the consideration their importance merits.

Publications other than Monthly Labor Review.—At the end of the fiscal year 1919, besides the 12 numbers of the Monthly Labor Review, there had been received from the Government Printing Office 13 bulletins. Two other bulletins were completed but had not been issued. The 25 publications issued contained 7,045 pages of printed matter, 93 illustrations, 22 diagrams, 26 charts, 13 line drawings, and 1 text chart.

The bulletins are published in series according to subjects and are numbered consecutively. A list of the series is as follows:

- Wholesale prices,
- Retail prices and cost of living,
- Wages and hours of labor,
- Employment and unemployment,
- Women in industry,
- Workmen's insurance and compensation (including laws relating thereto),
- Industrial accidents and hygiene,
- Conciliation and arbitration (including strikes and lockouts),
- Labor laws of the United States (including decisions of courts relating to labor),
- Foreign labor laws,
- Vocational education,
- Labor as affected by the war,
- Miscellaneous series.

In addition the bureau prepared and supervised the printing for the United States Employment Service, of a series of 13 pamphlets containing 659 pages, giving descriptions of occupations in some 22 industries and groups of industries.

During the year the bureau has accumulated and classified much material relating to the war, done a great deal of research work at the request of the War Labor Policies Board, supplied information requested by Members of Congress and other persons interested in labor matters, and prepared and printed many bibliographies relating to labor subjects. It has also carried on a systematic correspondence with the various State labor bureaus and other State agencies dealing with labor, thus bringing about closer cooperation with the States. Through the work of a special representative in Great Britain the bureau has been able to publish special information regarding labor developments in Great Britain.

Reports transmitted but not published.—In addition to the 25 publications issued (13 bulletins and 12 numbers of the Monthly Labor Review) and 2 bulletins which were completed but not issued, there were 12 in course of preparation. The 14 bulletins not issued relate to international labor legislation and the society of nations; labor legislation of 1918; preventable death in the cotton manufacturing industry; wages and hours of labor in the slaughtering and meat-packing industry; joint standard industrial councils in Great Britain; accidents and accident prevention in machine building; decisions of courts and opinions affecting labor, 1918; union scale of wages and hours of labor, May 15, 1918; wages and hours of labor in the boot and shoe industry, 1907 to 1918; wages and hours of labor in woolen and worsted goods manufacturing, 1918; wages and hours of labor in cotton goods manufacturing and finishing, 1918; housing by employers in the United States; proceedings of fifth annual meeting of the International Association of Industrial Accident Boards and Commissions, held at Madison, Wis., September 24-27, 1918; preliminary report of industrial survey in selected industries in the United States, 1919.

BUREAU OF IMMIGRATION.

Origin and functions.—This bureau was established by the immigration act of March 3, 1891, as the "Office of the Superintendent of Immigration." The title of Superintendent was changed to "Commissioner General of Immigration" by the act of March 2, 1895. That official served under the Secretary of the Treasury until 1903, when the Bureau of Immigration was made a part of the newly created Department of Commerce and Labor. It was finally made a part of the Department of Labor upon the organization of the latter in 1913. The duties of the bureau are primarily connected with the enforcement of the immigration and Chinese-exclusion laws. It is also charged, under the immigration act of February 5, 1917, with the examination and registration of all alien seamen arriving in United States ports. Prior to the creation of the United States Employment Service as a separate organization, that service was under the bureau's direction, but the business activities in that field are now limited to those of the Division of Information, which the law provides shall "promote a beneficial distribution of aliens." Throughout the period of the war the bureau rendered much special service to the Government, both under its own authority and in cooperation with other branches of the Government charged with the enforcement of war measures.

The following is a summary of some of the regular and special duties performed by the bureau during the past fiscal year:

GENERAL IMMIGRATION.

Summary of arrivals and exclusions.—The following statement summarizes the totals of arrivals, exclusions, and admissions of aliens for the fiscal year ended June 30, 1919:

Arrivals of aliens, July 1, 1918, to June 30, 1919.....	245, 647
Detained for special inquiry.....	39, 636
Admitted on primary inspection.....	206, 011
Detained for special inquiry.....	39, 636
Rejected by boards of special inquiry.....	5, 487
Admitted by boards of special inquiry.....	29, 929
Appeals.....	4, 140
Petitions for bonding.....	33
Petitions for hospital treatment.....	43
Petitions for transit privilege.....	3
Petition for admission until termination of war.....	1
Cases before Secretary of Labor.....	4, 220
Rejected by Secretary of Labor.....	3, 139
Admitted by Secretary of Labor:	
On appeal without bond.....	807
On bonds.....	234
For hospital treatment.....	36
For transit privilege.....	3
Until termination of war.....	1
Total.....	1, 081
Aliens admitted.....	237, 021
Aliens excluded.....	8, 626
Total alien arrivals.....	245, 647
Ratio of admissions to arrivals, 96.5 per cent.	
Ratio of exclusions to arrivals, 3.5 per cent.	

ALIEN ARRIVALS AND DEPARTURES.

As compared with the previous year, the fiscal year just closed shows a slight increase in immigration.

Tabulation.—The following statement gives some of the more important items of statistical information, to be found in much greater detail in the report of the Commissioner General of Immigration:

Arrivals (admitted):	
Immigrant aliens.....	141, 132
Nonimmigrant aliens.....	95, 889
Total.....	237, 021

Previous year:

Immigrant aliens.....	110, 618	
Nonimmigrant aliens.....	101, 235	
		<u>211, 853</u>

Increase or decrease:

Immigrant increase.....	30, 514	
Nonimmigrant decrease.....	5, 346	
Net increase.....		<u>25, 168</u>

Departures:

Emigrant aliens.....	123, 522	
Nonemigrant aliens.....	92, 709	
Total alien departures.....		<u>216, 231</u>

Previous year:

Emigrant aliens.....	94, 585	
Nonemigrant aliens.....	98, 683	
		<u>193, 268</u>

Increase or decrease:

Emigrant increase.....	28, 937	
Nonemigrant decrease.....	5, 974	
Net increase.....		<u>22, 963</u>

Increase in alien population, 1918 and 1919:

Arrivals (1918).....	211, 853	
Departures (1918).....	193, 268	
Net increase (1918).....		18, 585
Arrivals (1919).....	237, 021	
Departures (1919).....	216, 231	
Net increase (1919).....		20, 790
Increase in population in 1919 more than in 1918.....		2, 205
Increase in aliens admitted, 11.4 per cent.		
Increase in net addition to population, 12.2 per cent.		

Age of admitted immigrant aliens:

Under 16 years.....	26, 373	
16 to 44 years.....	97, 341	
45 years and over.....	17, 418	
Total.....		<u>141, 132</u>

Literacy of admitted immigrant aliens:

Total 16 years or over.....	114, 759	
Unable to read or write.....	2, 827	
Able to read but not write.....	443	
Illiterate (over 16 years of age).....		<u>12, 827</u>
Literate (over 16 years of age).....		111, 932

Illiterate, 2.6 per cent.

Financial ability.—There were shown to inspection officers by immigrant aliens admitted sums of money aggregating \$15,831,247, or an average of \$112 per person. About 42 per cent of those able to prove possession of money had less than \$50 each, 79,646 claimed to

¹ Admissible under exemptions provided by section 3 of the immigration act.

have paid their own passage, 49,773 admitted that their passage had been paid by relatives, and 11,713 that it had been paid by persons other than relatives.

Ages and periods of residence of departing aliens.—During the year 123,522 emigrant aliens left the United States. Of these, 60,731 had resided in the United States less than 5 years, 53,579 from 5 to 10 years, 5,610 from 10 to 15 years, 1,677 from 15 to 20 years, and 1,925 over 20 years. As to ages, 7,352 were under 16, 86,006 were from 16 to 44, and 30,164 were 45 years of age or over.

Exclusion of arriving aliens.—On account of the abnormal conditions during the past four years it is difficult to make comparisons with previous years. Exclusions in 1913 amounted to 1.38 per cent, in 1914 to 2.3 per cent, in 1915 to 5.3 per cent, while during the years 1916, 1917, and 1918 they were 4.9, 4.2, and 3.3 per cent, respectively. The past fiscal year shows a percentage of 3.5. As to numbers excluded, there were 24,111 for 1915, 18,867 for 1916, 16,028 for 1917, 7,297 for 1918, and 8,626 for 1919.

The following table shows the principal causes of rejection for the years 1910 to 1919, inclusive:

Cause of rejection.	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919
Idiots.....	16	12	10	18	14	6	5	9	4	1
Imbeciles.....	40	26	44	54	68	27	17	19	5	7
Feeble-minded persons.....	125	126	110	483	995	302	224	224	19	29
Insanity (including epileptics).....	198	144	133	198	197	128	151	146	95	67
Constitutional psychopathic inferiority.....								3	20	37
Likely to become a public charge (including paupers, vagrants, and beggars).....	15,927	12,048	8,182	7,956	15,784	15,596	10,427	7,893	2,836	4,005
Afflicted with contagious diseases.....	3,033	2,735	1,674	2,457	3,143	1,613	1,050	1,383	401	331
Afflicted with tuberculosis.....	95	111	74	107	114	89	106	119	85	57
Physically or mentally defective.....	312	3,055	2,288	4,208	6,537	955	1,703	1,734	315	343
Chronic alcoholism.....								10	24	10
Criminals.....	580	644	592	808	755	276	245	257	160	261
Prostitutes and other immoral aliens.....	316	253	263	367	380	291	439	510	161	86
Procurers of prostitutes.....	179	141	192	253	254	192	307	371	88	46
Contract laborers.....	1,786	1,336	1,333	1,624	2,793	2,722	2,080	1,116	474	774
Unable to read (over 16 years of age).....								391	1,598	1,456
Alien enemies.....									49	40

Reasons for exclusion.—It will be observed from the foregoing table that "likelihood of becoming a public charge" continues to be by far the most important single cause of rejections, about 46 per cent of those turned back at the ports being under that head. Illiteracy was second in importance as a cause of rejections during the past year as well as in 1918—the only years in which the "illiteracy test" in the new law has been in full operation.

Expulsion of aliens.—There have been expelled from the country under departmental process during the past year 3,068 aliens, com-

pared with 1,569 in 1918. The 3,068 expelled during the year are divided as follows with respect to causes of expulsion:

In the country five years or less:

Members of excluded classes at time of entry.....	2, 257
Became public charges from causes existing prior to entry.....	257
Violation of Chinese-exclusion laws.....	47

In the country three years or less:

Entered without inspection.....	183
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Aliens whose deportation is compulsory without regard to the length of time they have been in the country:

Sexually immoral.....	162
Anarchists.....	35
Criminals.....	127

Total deportations.—Adding together the 8,626 aliens excluded at the ports and returned to countries of origin, the 3,068 arrested and expelled from the country, and the 34 Chinese aliens whose deportation was ordered by courts or commissioners under the exclusion laws, it is shown that the total number of aliens deported during the year was 11,728, compared with 8,916 in 1918. In addition to the foregoing, there were arrested during the year, 637 aliens whose deportation was impracticable on account of war conditions. At the beginning of the fiscal year a plan was adopted which enabled the Department to release from custody aliens whose immediate deportation was impossible, as well as those deemed worthy of an opportunity to demonstrate their fitness to remain in this country. The plan provides that such aliens shall remain under the supervision of immigration officers, and that a percentage of their earnings shall be deposited at regular intervals in postal savings banks, such deposits being returned with accrued interest when the cases are closed by the deportation or final release, as the case may be. During the year the Department released 154 aliens under the provisions of this rule.

IMMIGRATION FROM INSULAR UNITED STATES.

Statistics of the movement of aliens from insular United States to continental United States were published for the first time in 1914, but the record is available since 1908. During the entire period a total of 29,138 have come to the mainland from all the insular territory. Of these 19,311 came from Hawaii; 8,559 from Porto Rico; 1,017 from the Philippines, and 251 from the Virgin Islands. During the past year 2,398 such aliens have been admitted to the mainland, of whom 1,305 came from Hawaii; 806 from Porto Rico; 180 from the Philippines, and 107 from the Virgin Islands. Formerly this movement of aliens from insular territory was a somewhat troublesome problem, but this was largely solved by the immigration law of 1917, which makes such aliens, as well as aliens passing

from one island to another, subject to the same examination as aliens coming from a foreign country. This does not apply to citizens of the islands, however, for they are not regarded as aliens. The commissioner of immigration at San Juan has experienced some difficulty in connection with aliens passing between Porto Rico and the Virgin Islands, and he has recommended that, in view of the proximity of these two, they be not regarded as foreign to each other in this respect; but this, of course, can not be done under existing law.

INDUCED AND ASSISTED IMMIGRATION.

The problem of induced and assisted immigration, which in prewar years was a serious one, gave little trouble during the year, but it is probable that former conditions will be revived. However, the new immigration law will afford a more satisfactory means of dealing with the problem than previous laws.

CONTRACT LABOR.

The number of contract labor cases which came to the attention of the bureau was unusually large, but they were of such a nature that legal proceedings against importers were instituted in only three cases during the year. However, investigations of many reported or suspected violations have been made, and 69 aliens who were found to have entered the country in violation of the contract labor clause were deported, as compared with 33 during the fiscal year 1918. During the year 774 alien contract laborers arriving at United States ports were denied admission as compared with 474 in 1918. It has always been possible under the law to import skilled laborers provided unemployed laborers of like kind could not be found in this country, but the immigration act of 1917 goes a step farther and provides that the necessity for importing such labor may be determined by the Secretary of Labor before importation is made. The law stipulates that permission to bring in laborers under this provision may be granted only after a hearing and investigation into each case, and such investigations have formed an important part of the work of the contract-labor division during the year. Concrete examples of the operation of the new law are found in certain Canadian border cases, where it has been a long established custom for employers to bring more or less skilled laborers from Canada for seasonal work. Formerly these cases occasioned much trouble. Many suits were instituted against importers but convictions were infrequent and the practice persisted. Under the new law, however, some employers who practically ignored the contract-labor law, are required first to present applications to the Department. On the whole, results have been satisfactory, although a more general observance of the rules would still save much embarrassment and delay and enable many applicants to avoid useless trips

to this country. Too often the blame is placed upon the Government when it should be borne by the importer.

IMPORTATION OF LABORERS FOR WAR NECESSITIES.

The principle alluded to under the heading of contract labor was utilized in a much broader way through the temporary admission during the fiscal year of 20,643 Mexicans and a smaller number of Bahama Island negroes for emergency labor during the war. This was accomplished under authority of section 3 of the law of 1917, which confers upon the Secretary of Labor discretionary power to admit temporarily aliens who are otherwise inadmissible. This waiver was strictly a war measure and met a labor need which could not have been supplied otherwise. The privilege was terminated at the close of the calendar year 1918, except with regard to certain classes of farm laborers. The existing arrangement as to these continued until the close of the fiscal year.

ORIENTAL IMMIGRATION.

Chinese immigration.—Only a comparatively small number of Chinese applied for admission during the year, the number admitted and rejected being 1,697 and 172, respectively, while 112 Chinese found to be unlawfully in the country were deported. The total number of immigrant and nonimmigrant Chinese, and those in transit through the United States to a foreign country, was 7,426, and the number of emigrant and nonemigrant aliens and transients departing from the country was 7,930, showing a net decrease of 504 in the Chinese population through immigration and emigration. The number of Chinese granted transit privileges during the year was 5,041, compared with 34,977 in 1918, of whom 28,838 were destined to France for war work. The Circuit Court of Appeals for the Ninth Circuit has rendered a decision (*Quan Hing Sun et al. v. White*, 254 Fed., 402) holding that Chinese persons who apply for admission to the United States and are rejected on primary inspection are entitled to an examination before a board of special inquiry—a privilege which is granted to all rejected aliens by the immigration law, but not by the Chinese-exclusion law. This decision has enabled the Department to take a long desired step in the direction of bringing the procedure in the cases of Chinese applicants into harmony with that followed in the cases of aliens generally. It is believed that good results will follow, through the assurance of fair and just hearings to all applicants and the prevention of delays in the adjudication of cases.

Japanese immigration.—During the year 10,056 Japanese immigrant aliens were admitted, as compared with 10,168 admitted in the previous year, while 171 were debarred and 137 deported after landing as compared with 201 and 52, respectively, in 1918. In the present fiscal year 4,848 nonimmigrant Japanese were also admitted, so that

the total admissions of this race, including immigrants and nonimmigrants, aggregated 14,904, and the number of departing, including emigrant and nonemigrant aliens, was 11,233, making the indicated increase in population 3,671.

Asiatic barred zone.—There have been very few applications for admission from the portions of Asia and islands adjacent thereto the native population of which is excluded under the immigration law of 1917. Of those applying, 19 were excluded and 11 found in the country in violation of the law were deported. India is within the barred zone and during the fiscal year only 171 were admitted from that country, including 68 East Indians or Hindus.

Smuggling over borders.—During the war Chinese and other inadmissible aliens were employed in war-material factories in Canada near the international boundary. Following the signing of the armistice practically all of the Chinese were dismissed from this employment and some sought surreptitious entry into the United States. During the war the border was so closely guarded by both Canadian and United States military authorities as well as by our immigration officers that the smuggling of aliens was practically impossible; but with the withdrawal of the military, the meagerness of the force of immigrant inspectors available for prevention of smuggling made it possible for some Chinese to gain illegal entry. However, a number of smugglers were caught in the act of bringing in Chinese illegally and every possible effort is being made to guard the border against further violations of the exclusion law. Chinese laborers continue to pass in transit to the West Indies, and there are substantial reasons for believing that the object of many of these is unlawful entry into this country.

The limiting of Japanese immigration to Canada has reduced the probabilities of any considerable movement of that race across the northern boundary. But unfortunately the same condition does not exist on the Mexican frontier, and some inadmissible Japanese gain entrance over that border. Investigations made during the year exposed a well-organized plan to circumvent the immigration law by Japanese laborers coming to Mexico, either direct from Japan or via Central and South American countries, for the purpose of gaining illegal entry into the United States at points along the southern California-Mexican border. During the investigation 37 persons implicated in the illegal importation of Japanese laborers were arrested, some of whom have already been convicted and given substantial penitentiary sentences, and 117 contraband Japanese laborers were apprehended and deported.

It is very strongly recommended that ample funds be provided for a patrol service to guard the borders, coast lines, and the insular territory against smuggling. The Department now has a small force

doing effective work, but this needs to be materially increased. The regular immigration officials, who are charged with the general enforcement of the immigration law, can not be expected to make the specialized effort necessary entirely to overcome the devious methods practiced by those who seek to enter the country surreptitiously. This class of work needs experienced officers who are free to devote all their time and energies to the task. During the past year, it was possible for a time to patrol certain places on the Mexican border and the supervising inspector in charge of that district reports that more progress was made in enforcing the law than had been the case for the entire ten previous years. But unfortunately it was necessary to abandon much of this specialized work because the available funds were exhausted. Until such a patrol is permanently reestablished with an adequate personnel, the Immigration Service can not fully meet the requirements of the law.

WAR ACTIVITIES.

By reason of the special training and experience of its officers the bureau was in a position to render important service in many outside lines of activity during the war, and the executives of the Departments of State, Treasury, War, Navy, and Justice have generously acknowledged its cooperation in carrying out various war measures. Under the act of May 2, 1918, entitled "An act to prevent in time of war departure from and entry into the United States contrary to the public safety," by direction of the President immigration officials were designated as control officers for incoming travel at all ports of entry, for outgoing travel on the land boundaries, and as permit agents for the examination of resident aliens seeking to leave the United States. The system of control authorized by this act went into effect September 15, 1918, superseding the joint order of July 26, 1917, referred to in the bureau's report for last year. During the period September 15 to June 30, 171,995 permits were granted to aliens to leave the country, and 4,119 applications for such permits were denied. At the close of the year 1,173 applications were pending, and in 3,477 other cases the permits were not claimed or applications were withdrawn. Identity cards for travel between the mainland and outlying possessions were furnished to 8,632 United States citizens, and 35,610 aliens' and 15,775 citizens' permits to cross the Mexican border were also issued. Practically every case required painstaking investigation and the work entailed much correspondence and clerical labor.

The War Department on July 1, 1918, assumed charge of interned enemy aliens, a task which the Department of Labor had previously performed; but the bureau expended much effort during the year in

determining the status of such aliens under the immigration law and taking action respecting the deportation of those found to be in the country unlawfully. Immigration officials throughout the country were able to render valuable assistance in the enforcement of the espionage, trading with the enemy, and sabotage laws. Another important duty undertaken was that of preventing the departure over land boundaries of men of military age not in possession of permits to leave the country. On the Mexican border 639 offenders were arrested. Investigations were made in nearly 2,000 cases of persons suspected of being deserters from the Army or evaders of the selective service law. A corresponding amount of work of this nature was also performed on the Canadian border. The provost marshal general has officially expressed his appreciation of the cooperation.

SEAMEN.

The immigration act of February 5, 1917, opened the way for a more adequate control of alien seamen arriving at United States ports than had hitherto been possible, and perhaps the largest single item of work performed by field officers during the year was in this connection.

The Department is gratified to note that the year's experience has confirmed its opinion that the problem of arriving seamen could be regulated so as not to interfere with their traditional rights and at the same time prevent diseased, criminal, or other inadmissible aliens from coming to the United States in the guise of seamen for the purpose of surreptitious entry. As the result of experience in the year 1918 the rules were revised and new methods introduced for work in the field. Under the present practice it is possible to segregate alien seamen for compulsory treatment in hospitals. Fellow workers on vessels are thus given protection against contagion, while segregation on ship-board eliminates a further danger from close association with diseased shipmates. Under the new practice all alien seamen arriving in United States ports are medically examined each time they arrive, the examination being similar to that made in the case of alien passengers. Identification cards are furnished to each seaman and many precautions are taken to prevent the spread of disease as well as unlawful entries. The great work entailed is indicated by the fact that during the fiscal year 810,097 seamen were examined, 261,551 identification cards were issued, and 4,053 seamen were certified for loathsome or dangerous contagious diseases and removed to hospitals for treatment. The amount of the work necessary will be more fully appreciated when it is understood that the examination of a seamen consumes more time than is required in the inspection of an immigrant. Owing to this added duty immigration officials were required to examine a total of 1,055,744 arrivals during the fiscal year, or only a little less than the average

number of immigrants examined during the 15 years of heavy immigration prior to the outbreak of the World War.

Arrangements should be perfected whereby the masters of vessels can be furnished by the American consular officers at foreign ports of departure with a supply of seamen's identification cards in blank, with full instructions concerning their proper use and the necessity that every member of the vessel's crew shall upon arrival at a United States port have in his possession an identification card properly made out and bearing his photograph. This procedure would materially reduce the time required for the examination of crews, with a corresponding elimination of delay to vessels when it is necessary to do this work after arrival. If blanks were supplied through consular officers proper crew lists might be promptly furnished to immigration officials on arrival and there would be no necessity for the imposition of fines on masters of vessels for failure to deliver such documents.

But while good has resulted to seamen under the new order of things, the seamen's law gives arriving seamen the right to leave their ships and makes it possible for them to enter the country without examination by immigration officers. The law provides that seamen desiring to remain in the country must present themselves for proper examination under the immigration law. Many do this, but more do not, and while many of the latter would be regularly admitted on examination, it is certain that many excludable persons choose this method of gaining illegal entry. It is apparent that a follow-up system is necessary in the case of deserting seamen who do not apply promptly for admission. This branch of the work should be delegated to the special patrol service previously recommended.

ADMINISTRATIVE FINES.

During the year the sum of \$58,055 was assessed against transportation companies in administrative fines, the largest aggregate amount so assessed (\$30,650) being on account of the failure of masters, owners, or agents of vessels to furnish the information required by section 36 with regard to alien crewmen. Other causes for which penalties were assessed were as follows: Bringing of illiterate aliens, \$12,400; bringing aliens who were diseased or defective, or otherwise inadmissible as specified in section 9, \$9,375; bringing such aliens as members of crews, \$450; failure to furnish proper manifest data as to alien passengers, \$2,180; failure to deport, detain on board, or pay detention expenses of excluded aliens, \$3,000.

Some difficulty has been encountered in connection with refunds of passage money to excluded aliens because of inability to locate the aliens at the foreign addresses given by them at the time of their rejection. Steps to remedy this condition are now under consideration.

A CENTURY OF IMMIGRATION STATISTICS.

The so-called passenger act of March 2, 1819, was not only the first United States law for the protection of passengers at sea but its requirement that the age, sex, and occupation of each person carried should be reported to customs officials at ports of arrival marked the beginning of our official statistics respecting immigration. Reference to this early law brings out the interesting fact that the record to the end of the fiscal year 1919 covers a period of one hundred years. Details concerning this earlier immigration seem very meager compared with the elaborate records provided for in more recent legislation, but the statistics as a whole afford a highly interesting picture of the immigrant tide during the century and the extent to which various peoples contributed to the total.

The number of aliens who came prior to the fiscal year 1820 has been variously estimated, but no authentic record has been preserved. It is said that there was an unprecedented influx in the years following the second war with Great Britain, and it is known the sufferings of these immigrants on greatly overcrowded ships was a potent argument for the enactment of the law of 1819. From 1820 to 1830 the average annual influx was only about 14,000, but it increased to an average of 60,000 in the decade 1831-1840; to 171,000 in 1841-1850; and to nearly 260,000 in 1851-1860; the two last-mentioned decades marking the beginning and rise of great movements from Ireland and Germany. The annual average fell to about 231,000 during the Civil War decade; rose again to 281,000 in 1871-1880, and reached the great height of nearly 525,000 annually in 1881-1890. This was the last wave in which immigration from northern and western Europe was in the majority, and even then the peoples of southern and eastern Europe were a close competitor. Industrial depression in the United States was largely responsible for a decrease to an annual average of approximately 369,000 in the decade 1891-1900, but in the 10 years following, 1901-1910, it reached the enormous average of nearly 880,000 a year. But the average accession was even greater during the first four years of the present decade, for in 1911-1914 it reached 1,033,283 annually. But war again intervened and the annual average fell to 234,536 in 1915-1919. In 1918 immigration reached the lowest level since 1862.

During the past century 33,200,103 aliens are recorded as having entered the country, of whom 8,206,675, or 24.7 per cent of the whole, came from the United Kingdom. Germany followed with 5,494,539, or 16.6 per cent. Then comes Italy with 4,100,740, or 12.4 per cent; Russia, 3,311,400, or 10 per cent; and the Scandinavian countries, 2,134,414, or 6.4 per cent, leaving a balance of 5,884,887, or 17.7 per cent, who came from other countries. Until

1882, when the first general immigration law was enacted, the ingress of aliens was almost unregulated. Some of the seaboard States made attempts to control the multitudes passing through their ports, but the courts usually held that such laws were unconstitutional on the ground that they attempted regulation of foreign commerce. During the great immigrant years in the forties and fifties there was considerable agitation in Congress for restrictive or selective laws, but except for an act aimed at the importation of Chinese prostitutes (enacted in 1875), the Federal Government made no attempt at regulation until 1882.

The law of 1875 excluded only women imported for the purpose of prostitution and convicts undergoing sentence for a crime not growing out of a political offense, but succeeding laws added to the list of undesirables until at present about 30 more or less distinct classes of aliens are denied admission to the country.

FUTURE IMMIGRATION.

The present is an appropriate time for reviewing the world emigration and immigration situation, so far as it may affect the United States. First considering the situation in Europe, which has been and undoubtedly will continue to be the chief source of our immigration, we may trace the development and explain the present status of immigration from Asia and from the neighboring countries of the Western Hemisphere.

The European situation.—During the century for which records of our immigration are available approximately 89 per cent of our immigrants came from Europe, 2.4 per cent from Asia, and somewhat less than 9 per cent from other countries, chiefly Canada and Mexico. Numerically, therefore, Europe is by far the most important of all sources. It is a familiar story that up to about 35 years ago the bulk of European immigration originated in the northern and western countries. The sources gradually shifted to southern and eastern countries. In 1907 the influx reached its highest point, and the latter furnished more than three-fourths of all arrivals from Europe as compared with less than 11 per cent 25 years earlier, in 1882. It is an equally familiar fact that while a large part of the earlier immigrants went to the land and were widely distributed in this country, those coming from southern and eastern Europe became in the main workers in cities and industrial districts. The older immigrants came mostly in family groups and settled permanently in this country. Later immigration was largely a movement of men without families, many, perhaps a majority, returned to their native lands after a few years of labor here. The widespread alarm over the great influx; the persistent demand for restriction; the efforts of Congress

to prevent the coming of the criminal and the diseased; the finding of the United States Immigration Commission in 1910 that immigration had greatly overstocked the unskilled labor market; the similar findings by the Commission on Industrial Relations; and, finally, the adoption of the "illiteracy test" in 1917, in the belief that it would reduce the number of laborers coming to our shores—these are all occurrences of the last generation.

Coming to the highly important, but obviously difficult subject of the probable trend of European immigration after the war, many phases of the situation must be taken into account. The history of our past immigration affords no really reliable guide by which to predict what effect the World War may have on the future flow from the various countries. Lack of statistical data prior to 1820, makes it impossible to observe in detail the influence the Napoleonic wars, and our second war with Great Britain had upon immigration, but it is recorded that they were followed by a sudden rush which reached the number of 17,000 in 1817. It is also worth noticing that most of them came from a country with which we had recently been at war. On the other hand, the immigration decreased following the Crimean War, but this was undoubtedly due to causes other than that conflict.

The Franco-Prussian war seems to afford safer ground for comparison with the present situation. The German immigration fell from 131,000 in 1869 and 118,000 in 1870 to 82,500 in the war year of 1871, but rose again to more than 140,000 in 1872 and to nearly 150,000 in 1873; while defeated France, which sent us an annual average of only 3,600 immigrants in the three years 1869–1871, sent an average of 11,250 during the three years following the conflict. These figures make it appear that in this instance at least, war, regardless of victory or defeat, may have been an actual incentive to immigration. The Franco-Prussian war came in the midst of a great transoceanic movement of the German people, and it is a notable fact that even the attractions of a victorious and united Germany were insufficient to hold the population, for the egress continued and increased until 11 years later it reached more than a quarter of a million souls in a single twelvemonth.

Immigration from Italy, Austria-Hungary, and Russia, not to mention Greece and the Balkans, had reached a stage at the outbreak of the present war which closely corresponded to the case of Germany in 1871. That is to say, immigration from those countries was at flood tide and promised to so continue for years. Consequently, if this analogy may be trusted, we may expect a repetition of the German experiences unless, of course, artificial barriers are interposed by the countries themselves, by the United States, or by factors that have not been taken into consideration, but there is another highly impor-

tant element which then affected German immigration only to a limited degree but which must be considered in connection with the present situation. That is the greatly disturbed political condition in which central and eastern Europe finds itself as the result of war. This factor if long continued may have a powerful influence upon future immigration from such sources.

Economic pressure and political unrest and oppression are potent promoters of immigration. The first, of course, accounts for the greater part of the enormous movement from Europe to the New World, but the importance of the German revolution of 1848 in this regard must not be overlooked, nor can we forget that oppression, as well as economic reasons, was behind the great Jewish influx from Russia and Roumania. In the existing situation disturbed economic and political conditions both prevail over a great part of Europe. It is a historical fact that emigration from Germany practically ceased with the stabilization of economic conditions there; but the close of the present war finds that country in the midst of an economic as well as a political crisis, and these conditions may operate to reestablish Germany as an important immigrant-furnishing country.

On the other hand, Germany lost upward of 2,000,000 men in the war, and this loss has appreciably diminished the age and occupational groups from which most immigration springs. Also the economic classes which are most prone to emigrate may see hope for themselves and their children in the changed political status of the fatherland and willingly endure the incidental hardships of reconstruction on that account. But it is reasonable to suppose that there are many of other classes in Germany, including army and navy officers, small capitalists and others, upon whom the burden of changed conditions will fall so heavily that they will resort to emigration for relief.

The situation in what was once Austria-Hungary is bewilderingly complicated, and it is difficult to say what the effect upon immigration may be. In 1914—and that year was fairly typical—10 races or peoples each contributed largely to the 244,000 who came from that empire. These included, in round numbers, 49,000 Poles, 43,700 Magyars, 35,000 Croats and Slovenes, 32,000 Ruthenians, 29,000 Germans, 25,300 Slovaks, 22,000 Roumanians, 20,400 Hebrews, and 9,300 Bohemians and Moravians. The former Polish population, and the Jews as well, are now mostly in reconstructed Poland; the Bohemians, Moravians, and Slovaks are in Czecho-Slovakia; the Croatians and Slovenians are largely transferred to the Kingdom of the Serbs, Croats, and Slovenes. Presumably most of the Roumanians and Ruthenians will also come under other sovereignties. Therefore, the population of the two countries is largely reduced to Germans and Magyars, the latter coming from Hungary proper. There are still many Jews in both countries, as well as remnants of other peoples

but the Germans and Magyars are overwhelmingly predominant. The German element in our Austro-Hungarian immigration has come largely from Hungary in recent years—86,000 out of a total of 122,000 in the five years 1910–1914. Although the boundaries of the Austria of the future are not definitely determined at this writing, it is certain that its population will be predominantly German, and the figures indicate that they have not emigrated to the United States in large numbers in recent years. However, the war has left Austria in a most distressing economic condition, and a people in economic distress almost invariably seeks relief through emigration. On the other hand, a large proportion of the population in what promises to be the new Austria is in the single city of Vienna, and as a rule the dwellers in great cities have not emigrated. As a matter of fact, the population of such cities is partly made up of people who went there from the country or smaller towns in preference to emigrating to another land. However, if Vienna under the new order of things is deprived of its former commanding commercial position in central and southeastern Europe, it may be expected that its population will seek refuge elsewhere. Whether the drift will be toward the United States or to other countries is uncertain. Political developments may also have an important effect on emigration from Austria, but the present situation affords little indication of what may be expected in that regard.

The population of Hungary proper is more rural than that of Austria and therefore more likely to emigrate, but what happens will probably depend largely upon the economic and possibly the political developments following peace. Hungary is primarily agricultural, and it is not believed that this industry was greatly demoralized during the war or by succeeding events. This being the case, it is not unreasonable to expect that when something like normal conditions are restored in central and western Europe, Hungarian agriculture will find itself in a highly favorable position, and this would normally act as a powerful restraint to emigration.

Turning to Russia a still more complex situation is found, and it is difficult to say what may be expected in the way of immigration from that country. For many years prior to the war Russia had been one of the chief sources of our immigration, but until about 1910 comparatively few real Russians had joined in the movement. In 1907, for example, when the influx from Russia reached an approximate total of 259,000, only 16,000 persons of the Russian race were among them, compared with, in round numbers, 115,000 Hebrews, 73,000 Poles, 5,000 Lithuanians, 14,300 Finns, and 13,500 Germans. In other words, the real Russians represented only about 6 per cent of the total. But in succeeding years the number increased until in 1913 about 48,500, or nearly 17 per cent of the total, were of that race.

Investigations made in the peasant villages of Russia that year showed that unless checked the movement would eventually increase to enormous proportions. At present Russia is in chaos and the final outcome can not be foreseen. Finland is now recognized as a political entity, and the same is true of Poland, so that the sources of perhaps a majority of the immigrants in the past are removed from Russian control; and so are the Baltic States, including Lithuania. South-western Russia, now familiarly known as the Ukraine was a source of much Hebrew and some Little Russian immigration. The remainder of European Russia, commonly known as Great Russia, is at the moment largely included in Soviet Russia. The latter section has furnished comparatively few immigrants up to date.

Italy has furnished more immigrants to the United States than any other country except the United Kingdom and Germany, and from the beginning the exodus has been economic. It is densely populated and owing to restriction of opportunity and the rapid growth of population enormous numbers have been forced to emigrate. The United States has attracted a majority of the trans-oceanic emigrants, but nearly as many have gone to South America and other parts of the new world, and large numbers have left Italy every year for a more or less permanent stay in various European countries. A considerable part of the movement to this country was only temporary, and returning immigrants from both North and South America have contributed considerably to the economic upbuilding of their mother country.

Immigrants from Greece averaged about 25,000 annually prior to the war, and an average of about 21,000 came during the years of 1915-1917, but it fell to 1,910 in the following year and to only 386 in 1919. As in the case of Italy, economic reasons account for practically all immigration from Greece, but there is no authentic information as to the effect war may have upon immigration from that country.

The Balkan States -Bulgaria, Serbia, Montenegro, and Roumania, have never contributed a large volume of immigration, the average for the seven years prior to the war being about 9,000 annually. The movement was considerably reduced during the Balkan wars of that period, but it never exceeded 16,100, the number reached in 1908. The Balkans have been in the midst of war for about nine years and it would be strange if resulting economic and political conditions did not impel emigration to an extent equal to if not greater than that occurring in normal times. The same may be said of Turkey in Europe, a territory which dwindled to small proportions as a result of the Balkan wars and may disappear altogether in the final settlement of the world conflict.

Turkey in Asia presents another example of a country which has contributed a considerable stream of immigration that included few

persons of the country's dominant race, for of the approximately 109,000 coming from that source in the eight years 1907-1914, only 6,000 were Turks, the predominant peoples being Armenians, Greeks, and Syrians. One hesitates, however, to predict what the future immigration of the real Turkish people may be.

Turning to the newly created countries of Poland, Czecho-Slovakia, and Jugoslavia, it is exceedingly difficult to estimate the part they may play in future immigration. The Polish people have long been an important factor in the influx from Europe, and from 1899, when immigration was first recorded by race as well as country of origin, up to the outbreak of the war, 1,402,695 Polish immigrants came to the United States. In fact, during that period they led all other peoples except the south Italians and Hebrews. Like most immigrants, the Poles came largely for economic reasons, but undoubtedly dissatisfaction with their political surroundings was also an incentive and it remains to be seen whether the realization of their long dream of a restored Poland will keep them at home in the future. The future of Polish immigration will depend very largely upon the economic progress of the reestablished nation. The same argument is applicable to the Slovaks, who, as subjects of Hungary, ranked sixth among immigrants in point of numbers furnished, but who are now united with the fellow Czecks in the war-born nation of Czecho-Slovakia, and it applies as well to the Bohemians, Croatians, Slovenians, and Finns, all of them important immigrant races who have ceased to be subject peoples.

The Department does not look for any particular change in immigration from France. It has always been small; the total admissions from that country during the 100 years for which statistics are available are only 523,806. Italy, Austria-Hungary, and Russia each contributed a greater number in the two years just preceding the war, 1913 and 1914, than France did during the century.

England has long been an important emigrant furnishing country, and while her overseas dominions have attracted the majority of them in recent times, the United States has always received a generous share. On the contrary, this country has always been the haven of a majority of those leaving Ireland, but this movement is now little more than a shadow of what it was in earlier days.

So far as the neutral countries are concerned, it is expected that there will be a considerable influx of deferred immigration.

Considering Europe as a whole, there are some factors growing out of the war which may retard immigration and many which may promote it. Future immigration will depend primarily on the ability of European countries to initiate an era of peace and profitable employment for those who have survived the war and those who hitherto have been occupied in its pursuit.

Emigration to Europe.—Careful attention is due to the subject of alien emigration from the United States to Europe. Large numbers of former immigrants will return to their native countries either permanently or temporarily, but there will be nothing like a general exodus. The extent of the outward movement will, as in the past, very largely depend on economic conditions here and in Europe. Emigration is no new thing but has been one of the most striking characteristics of the newer movement of European peoples elsewhere discussed. Official records of the outward movement of aliens date only from 1908, and in the seven fairly normal years up to the outbreak of the war a total of 2,217,000 emigrant and nonemigrant aliens departed for Europe, compared with 6,200,000 immigrant and nonimmigrant aliens admitted from that source. In other words, 36 aliens left the country for every 100 admitted. That this condition was not peculiar to the particular period under consideration is shown by records of the Transatlantic Passenger Association, which disclose that during 22 years (1899–1910) as many as 37 steerage passengers were carried from the United States to Europe for every 100 brought from European to United States ports. Thus it is an established fact that emigration is by no means a recent phenomenon but is a fixed concomitant of the movement from Europe.

During the five war years the average annual emigration to all Europe was only 106,000, compared with an annual average of nearly 217,000 in the seven years prior to the war, and the formerly large annual exodus to Austria-Hungary, Russia, and other eastern European countries almost entirely ceased. If normal conditions had continued during the last five years it may be presumed that approximately 1,500,000 aliens would have returned to Europe, instead of the 530,000 who actually did return. It is natural to suppose that many whose home-going has thus been deferred will depart whenever steamship facilities are available. To what extent previously made plans may have been changed by reason of the war can not be estimated. However, owing to conditions in Europe many who had intended to return are likely to remain here permanently and send for their families. That many should desire to go to their native lands to visit relatives, look after property interests, or to bring over their families is only natural, and following the signing of the armistice there was every indication that an exodus of this nature would occur as soon as ocean transportation became available. Reports have reached the Department, however, which indicate that the disturbed conditions prevailing in Europe have led many to postpone if not abandon that purpose.

Chinese immigration and exclusion.—The records show that a single immigrant from China arrived in 1820, the first year of our immigration statistics, and that up to 1853 a total of only 88 had come. The

discovery of gold in California, which attracted people from nearly every country in the world, soon brought the Chinese also, and 1854 witnessed the beginning of what was to be the first Asiatic problem in the west, for 13,100 were then admitted from that country. The influx was practically unrestricted for 30 years, and during that period (1854-1883) more than 288,000, or an average of 9,600 a year arrived, but the immigration was checked as suddenly as it began, by the adoption of an exclusion act. In 1884 only 279 and in 1885 only 22 immigrants were admitted from China. During the 35 years following exclusion, that is, from 1884 to 1919, the total immigration from that country has been, in round numbers, 56,500, or an annual average of about 1,600, showing that exclusion measures have materially reduced the number. As a matter of fact, during the 12 years (1908-1919) that records of emigration as well as immigration have been kept, the number of aliens departing for China has slightly exceeded the number admitted from that source. It is also interesting to note in this connection that as the result of exclusion the number of Chinese in the United States has decreased quite rapidly in recent decades, as the following figures giving the number of natives of China in our population at various census periods will show:

1860.....	35,565
1870.....	63,042
1880.....	104,468
1890.....	106,701
1900.....	81,534
1910.....	56,756

It may as a natural consequence be expected that the census of 1920 will show a further decrease, for, as already stated, emigration has exceeded immigration.

The story of how Chinese exclusion was brought about is an interesting one. The people of California had been opposed to the immigration almost from the beginning. Following the negotiation of the Burlingame treaty of 1868, agitation, though abated for a time, was again renewed. California enacted restrictive legislation, but it was declared unconstitutional by both the State courts and the Supreme Court of the United States. In 1876-77 a Congressional inquiry took place, after which appeals from the Pacific Coast States and their representatives became more vigorous in support of exclusion. In 1879 Congress passed a bill limiting the number of Chinese who could come to the United States in any one vessel to 15. This was the first Federal measure passed on the subject, but President Hayes vetoed it.

In 1880 a treaty was concluded with China which gave the United States the right to "regulate, limit, or suspend" the immigration of Chinese laborers, but not to "absolutely prohibit it." In 1882 Congress sought to take advantage of the provisions of the new treaty

and passed a bill suspending the immigration of Chinese laborers for 20 years; this was vetoed by President Arthur. Later in the same year, however, a bill providing for a 10 years' suspension but giving the right of reentry to Chinese lawfully in the United States, became a law. In 1884 another law was passed which strengthened the law of 1882 in some particulars.

In 1886 China indicated a desire to negotiate a treaty to prohibit the emigration of Chinese laborers to the United States, even including laborers who had been in this country and returned to China. Such a treaty was drawn and signed on March 12, 1888, its provisions being that Chinese laborers should be excluded for 20 years, and that those who returned to China would not be permitted to reenter unless they had left in the United States a wife, child, parent, or property to the value of \$1,000. An effort was made in the act approved September 13, 1888, to carry out its provisions, but China's final refusal to ratify the compact nullified its vital parts. Then followed the act approved October 1, 1888, known as the Scott law, which closed the doors against even returning Chinese, so that practically complete exclusion was provided. In 1892 the famous Geary Act was passed which extended the exclusion act of 1882 for another 10 years, and made various amendments, including a provision providing for registration of all Chinese laborers within a stated period.

Following this legislation negotiations were resumed, and on December, 8, 1894, a treaty was proclaimed which provided for the exclusion of all Chinese laborers for 10 years, except returning laborers who had wives, children, parents, or property worth \$1,000 in this country, thus nullifying the drastic provision of the Scott law, which refused departing Chinese of every class the right to return.

In 1902 a law was enacted which extended all Chinese-exclusion laws then existing "without modification, limitation, or condition," and in 1904 such laws were made applicable to the insular territory. Chinese immigration from such territory to the mainland, or from one island group to another, was prohibited.

The only classes of Chinese aliens now admissible to the United States are teachers, students, travelers for curiosity or pleasure, merchants and their lawful wives and minor children, officials of the Chinese Government and their body and household servants, persons holding return certificates, persons passing in transit to some foreign country, and those whose physical condition necessitates immediate hospital treatment. During the fairly typical year of 1918, when 1,576 Chinese immigrants were admitted, the principal occupations represented were as follows: Professional pursuits, 60; laborers, 127; merchants and dealers, 564; servants, 17; miscellaneous, 477, and of such as gave no occupation, including women and children, 331:

Chinese women have never come to the United States in great numbers, and in 1882, when the flow from China reached its highest point, only 116 females were among the 39,579 immigrants arriving. The proportion of women in recent years has been larger than formerly, but the average annual admissions are now only about 260. According to the census of 1910 the population of continental United States included only 1,788 females who were born in China, and a few of these were not of the Chinese race. Putting it in another way, there were in 1910, 3,074 males to every 100 females in our Chinese-born population. No other people showed such a wide disparity in this regard; the nearest competitors being the Montenegrins with 1,833 and the Bulgarians and Greeks with, respectively, 1,540 and 1,193 males to every 100 females, while among oriental peoples other than Chinese, the Japanese showed 870 and natives of India 427 males per 100 females. This lack of women is obviously a highly important factor in the situation because it insures a slow increase in the purely Chinese population.

JAPANESE IMMIGRATION.

Japan appears in our immigration statistics for the first time in 1861, when one person was admitted from that country, but the movement did not become important until much later, as the following record of admissions by decades since 1860 will show:

1860-1869.....	137
1870-1879.....	193
1880-1889.....	1,583
1890-1899.....	13,998
1900-1909.....	139,712
1910-1919.....	77,125

The census records mention Japan for the first time in 1870, and the number of natives of that country in the United States at that and subsequent census periods were as follows:

1870.....	73
1880.....	401
1890.....	2,292
1900.....	24,788
1910.....	67,744

The above immigration figures include the movement to Hawaii as well as to the mainland since 1900, while the census figures relate only to continental United States. The number of native-born and foreign-born persons of the Japanese race in Hawaii in 1900 and 1910 follows:

Nativity.	1900	1910
Born in Hawaii.....	4,881	19,889
Foreign born.....	56,230	59,786
Total.....	61,111	79,675

It will be remembered that the passport agreement, which was made in 1907, provides, in effect, that Japan will not issue passports good for continental United States to laborers unless such laborers are coming to resume a formerly acquired domicile; to join a parent, husband, or children; or to assume active control of an already possessed interest in a farming enterprise in this country. While the agreement relates only to immigration to continental United States, Japan soon voluntarily extended the same provisions to Hawaii, so that in effect all immigration of Japanese laborers is subject to its terms. Nonlaborers, of course, are not affected and are free to come and go under the same conditions as aliens of other nationalities.

During the 10 years prior to the agreement (1899-1908), a total of 142,656 Japanese immigrants were admitted to the United States and Hawaii, as compared with 80,532 admitted in the 11 years 1909-1919. While there has been a numerical reduction in the influx under the agreement, there is still a very considerable immigration from Japan. It is only possible to conjecture what the extent of such immigration might have been had it not been for the restraining effects of the agreement. Japanese immigration reached the high-water mark in 1907, when 30,824 of that race were admitted.

In 1909, the first full year under the agreement, only 1,596 Japanese were admitted to continental United States, but the number increased regularly year by year, until it reached 7,671 in 1919. Immigration to Hawaii has fluctuated considerably during the period since the agreement, 1,679 being admitted in 1909, 4,062 in 1914, and 2,385 in 1919. The influx as a whole—that is, to Hawaii and the mainland combined—increased from 3,275 in 1909 to 10,056 in 1919, or more than threefold.

It is a noticeable fact that the comparatively large ingress of Japanese since the agreement is due to the increased immigration of women. This is clearly brought out by the statistics, which show that 122,293 males were admitted during the preagreement period, compared with only 33,510 admitted under the agreement, while the total number of females coming in these two periods was 20,363 in 1899-1908 and 80,532 in 1909-1919.

The increased number of women is not considered surprising in view of the fact that the agreement leaves Japan free to grant passports to women coming to join husbands, although such women may be of the laboring class and may become laborers here. A large part of the women thus admitted secure the right to come under the terms of the agreement based on a peculiar wedding ceremony or contract whereby women in Japan become the wives of men already in the United States, the class being popularly known as "picture brides."

Prior to May 5, 1917, if female applicants were otherwise admissible under the general terms of the immigration law then in force, and pre-

sented papers issued under the agreement, admission followed only after the performance of a marriage ceremony in accordance with the laws of this country. This, in effect, allowed a picture bride while in an immigration station at a United States port to qualify as the wife of a resident of the United States in order to become admissible under our immigration law—something not contemplated by either its spirit or letter. In other words, a woman, no matter whence she might come, arriving at one of our ports without possessing the qualifications required by our law for entry might qualify by being permitted to assume a status *after* arrival which she should have had *before* arrival. This practice was not satisfactory to the Department. Therefore when the present immigration act containing the illiteracy test was passed it became imperative before it took effect to fix the legal status of these alleged marriages, as a number of the women who applied for admission as such wives had been found to be illiterate. In the absence of treaty provisions the validity of such a marriage is to be determined by the law of the place where it is celebrated, and if valid there it will, generally, be regarded as valid in any State or country in which the parties may subsequently reside, although invalid under the law of the subsequent domicile if contracted or celebrated there. It therefore became necessary to ascertain what was the law of Japan upon the subject, and whether that nation provided for and made legal a marriage contracted while one party to the marriage was living there and the other at the time actually in a foreign jurisdiction. The Department accordingly made extensive investigations, as a result of which it was learned upon high authority that the Japanese law provides for the complete legalization of the marriage ceremony upon official notification by the contracting parties and their witnesses to the Government registrar; that this notification may be either oral or in writing, and if the latter is the case it is not necessary that the parties appear personally before the registrar, but the notification to him may be made by a duly signed and sealed document, the place of actual residence of the parties not being material; that under this law it is possible for a Japanese man residing in the United States to contract a valid marriage with a woman residing in Japan by giving official notification to the registrar in that country in writing over his personal signature and seal; that the woman who becomes a party to a marriage of this kind is always furnished with a certified copy of the family registry, attesting the marriage, upon which document the Japanese Government issues to her a passport as the *wife* of a Japanese resident of the United States. Accordingly the Department (May 5, 1917) adopted the following rule of administration:

That the validity of these marriages be recognized unless or until it is definitely shown that they are not legal marriages under the laws of Japan, or until it satisfactorily

appears that the residence in the United States of one of the parties brings the consummation of the marriage ceremony within the jurisdiction of our laws; that proof of such marriages be required not only by a certified record of the registrar but also by a certified copy of the notification of marriage made out by the party to the same living in the United States; and that marriages at our ports be prohibited.

In pursuance of this rule passports issued to wives of Japanese as above indicated are accepted, unless fraud or mistake in their issuance or presentation to immigration officers is made to appear, and marriages at our ports have not since been permitted.

The Pacific Coast States continue to be the destination of nearly all Japanese immigrants, and 82.5 per cent of those admitted to the mainland since 1909 expressed the intention to reside there as compared with 88.5 during the preagreement period. California is far in the lead of other States, as shown by the fact that prior to the agreement 44.9 per cent were destined to that State as compared with 62.1 per cent during the past 11 years. On the other hand, the proportion destined to Washington decreased from 37.1 per cent of the whole in 1899-1908 to 16.1 per cent in 1909-1919.

The total number of Japanese aliens, immigrant and nonimmigrant, admitted to Hawaii and the mainland in 1909-1919 was 116,728, and the total number of emigrant and nonemigrant aliens leaving was 97,849, showing an excess of arrivals over departures of 18,879. In this connection it may be noted that 13,579 more males departed than arrived during the period, while among females the excess of arrivals over departures was 32,458.

OTHER ASIATIC IMMIGRATION.

The Pacific Coast States were for a time faced with an inflow of East Indian laborers which, if it had not been checked, would have assuredly created another serious problem. Nine immigrants of this race were admitted in the year 1900, but the number increased until in 1910 it had reached 1,782. This was not a large number as immigration goes, but the Pacific Coast States had had experience with other oriental immigration which began in a small way and developed to large proportions. Demands for exclusion were made, which was in part possible under the then existing law. The number admitted in 1911 was only 517, compared with 1,782 in the previous year, while in the next six years (1912-1917) a total of only 756 came. The attitude of Canada toward East Indian immigration also helped materially to reduce the number coming to the United States.

Various laws were proposed as a barrier against possible future immigration from India, but this was finally accomplished through the so-called barred-zone provision in the immigration act of February 5, 1917. Section 3 of that act provides in part for the exclusion from the

United States of natives of the continent of Asia and adjacent islands lying within certain specified meridians of longitude and parallels of latitude. The barred zone thus described includes India, Siam, Indo-China, parts of Siberia, Afghanistan, and Arabia, the islands of Java, Sumatra, Ceylon, Borneo, New Guinea, Celebes, and various lesser groups. Exception is made in favor of Government officials, travelers for curiosity or pleasure, and persons of certain specified professional classes, so that in effect laborers only are prohibited. The actual boundaries of the barred zone include a portion of China, but the act provides that where immigration regulation—or rather exclusion—is “provided for by existing treaties” the geographical exclusion is not applicable; hence China is not within its scope.

OTHER IMMIGRATION SOURCES.

Canada.—The records of earlier immigration from Canada are very incomplete, but our census shows that as early as 1850 there were 147,711 natives of that country in our population. In 1910 it had reached 1,204,637, including 385,083 French and 819,554 of other origin. Newfoundland had contributed an additional 5,080, but natives of Canada alone ranked fifth among our foreign-born peoples, being exceeded only by natives of Germany, Russia, Ireland, and Italy. This record indicates Canada's importance as a source of immigration.

On the other hand there has been, particularly in recent years, a considerable amount of emigration from the United States to Canada, including both natives of this country and of former immigrants, and the Canadian census shows that there were 303,680 natives of the United States in the Dominion in 1911, as compared with 127,899 in 1901, and 80,915 in 1891.

During the 11 fiscal years 1909–1919, the total immigration from Canada to the United States, including returning American citizens, was approximately 1,288,000, as compared with an emigration to Canada from the United States of 1,072,000, or a balance of about 216,000 in our favor. In the movement of the United States citizens alone to and from Canada the balance is in favor of the latter, for during the past 10 years nearly 562,000 have gone there and about 367,000 have come to the United States. It should be understood that these groups do not include those who cross the border temporarily in either direction, but only those who come or go for permanent residence.

Alien immigrants from Canada to the United States are largely made up of persons of northern and western European descent or birth. The chief elements in the order of their importance are the English, French, Scotch, Irish, German, and Scandinavian. Peoples of southern and eastern European stock form relatively a small part of the movement.

Mexico.—Immigration from Mexico is not very large, but it plays an important part in the labor supply of the southwest. In fact much of it is occasioned by the demand for labor in the border States. The records show that in the past 20 years about 187,000 immigrants have been admitted from Mexico. The majority of these were native Mexicans, but there is also a small movement of Europeans and Asiatics over the border every year. The immigration legislation of Mexico lacks the restrictive features of our system, with the result that some diseased, criminal, or otherwise inadmissible aliens from Europe and Asia seek illegal entry over the Mexican border, making that border an exceedingly difficult field of work.

West Indies and Central and South America.—The West Indies, including Cuba, Jamaica, and other islands, have become an important source of immigration in recent years, the total admissions during the past 20 years being approximately 215,500. The peoples chiefly represented in this movement are African (black), who came mainly from Jamaica and the Bahamas, Cuban, and Spanish. As in the case of Mexican immigration, many of those coming from the West Indies are seasonal laborers who find employment in Florida, but the development of steamship connections between the islands and northern ports has resulted in a considerable movement of Negroes who stay more or less permanently in New York, Massachusetts, and other eastern States.

There is comparatively little immigration from Central and South America, the total number coming from these two sources in the last 20 years being 20,603 and 52,009, respectively. These are divided between natives of the various countries and Europeans who settle there for a time and then move to the United States.

Australasia.—Australia, New Zealand, and Tasmania combined have contributed somewhat less than 22,000 immigrants in 20 years, the majority of these being of British stock. There has been no increase in the movement in recent years and there is little or no indication that these far-away countries will ever become a source of much immigration.

THE PASSPORT VISÉ SYSTEM ABROAD.

As stated in my annual report for 1918, shortly after our entry into the World War it became apparent that the United States must protect itself against the enemy, both at home and abroad; and, on the 26th day of July, 1917, the Secretary of State and the Secretary of Labor issued a joint order requiring passports and certain information from aliens desiring to enter the United States during the war. This joint order, and the regulations issued thereunder by the Department of State, were the result of conferences between the two

Departments upon the subject of proper supervision of aliens coming to this country during the continuance of the war. While these regulations were being enforced at our seaports and on the borders by immigration officers, and abroad by the diplomatic and consular officials, efforts were directed by the interested branches of the Departments of State, Treasury, War, Navy, Justice, and Labor toward the preparation of a law on that subject. These efforts resulted in the passage of the act of May 22, 1918, "To prevent in time of war departure from and entry into the United States contrary to the public safety," upon which the proclamation and Executive order of the President were based, establishing regulations the enforcement of which in foreign countries devolved upon the diplomatic and consular services, and in our own land upon the Customs Service of the Treasury Department and certain officials of the Department of Justice, and upon the Bureau of Immigration. As a part of these regulations the joint order above referred to was continued in force by Executive order.

CHILDREN'S BUREAU.

According to the act of April 9, 1912, creating the Children's Bureau, it is its duty to investigate and report upon all matters pertaining to the welfare of children and child life. The law provides that the bureau "shall especially investigate the questions of infant mortality, the birth rate, orphanage, juvenile courts, desertion, dangerous occupations, accidents and diseases of children, employment, legislation affecting children in the several States and Territories." Much effort has been made to cover this great field, but the task of investigation is scarcely begun. Reports have been made in various forms with a view to making the results of investigations available to the largest possible audience. The intensive investigations have been reported in the usual form of bulletins. Other forms of publicity have been utilized, among them Children's Year.

Various Government bureaus are carrying on technical studies in their own fields involving the welfare of children, directly or indirectly. Such studies should not be duplicated. But it is evidently the intent of the law, according to the words of the statute quoted above, that the Children's Bureau—the only Government body dealing only with children—should be charged with general responsibility for studying and popularizing information in the whole field of child welfare. Hence a recognized coordination should be established between all Government bureaus dealing with scientific studies or popular activities affecting children, and such studies and activities should be undertaken with mutual understanding. It is therefore felt that it would be especially desirable for other departments of the Government which include bureaus,

services, or divisions studying problems including children to designate representatives to act upon a standing liaison committee, and congressional action is suggested to the same end.

It has been possible for the Children's Bureau to accomplish the work of Children's Year because of the special allotment of \$150,000 from the President's fund for that purpose. During the progress of the year and in the follow-up work since last April there has been an increasing demand upon the bureau for investigations of various types, surveys, children's health conferences, and other demonstrations—all work of a constructive character and in the highest degree important. The appropriation available for the current year compels the bureau to leave this work untouched for the greater part. According to a moderate plan of reorganization based upon the experiences of last year a total appropriation of \$473,220 is requested. This is a minimum estimate for efficient work on lines already undertaken; it must be augmented in order to develop new lines of investigation.

Children's Year.—The general purpose and activities of Children's Year as a war-time activity were stated in my sixth annual report. Children's Year ended April 6, 1919, the close of the second year after this country's entrance into the war, and although its results can not be reckoned fully either now or at any time, certain outstanding facts indicate its widespread influence. The interest aroused by the campaign continues and grows. State Children's Year chairmen of 31 States have formed themselves into an advisory committee offering cooperation with the Children's Bureau and forwarding many kinds of child-welfare work in their respective States. During the past year, in cooperation with the women's committees of the Council of National Defense, about 17,000 local child-welfare committees were organized with a membership of several million women who enlisted the professional aid of physicians, nurses, and others and obtained local financial backing for their work. Over 18,000,000 copies of publications were sent out in response to requests during the year.

Child hygiene.—The weighing and measuring test of babies and children of preschool age has been conducted up to May 4, 1919, by these committees in 16,811 cities, towns, villages, and rural communities, and the Children's Bureau has distributed in response to requests over seven and one-half million record cards for use in these tests. In its literature the Children's Bureau has shown the value of child hygiene divisions as a needful feature of a competent State organization for child protection. Since the announcement of Children's Year, 21 States have created such child-welfare divisions, in two cases under the State department of education, in 19 under the State department of health. The total number of States so equipped is 28 at this writing, and the establishment of such

divisions is under discussion in other States. In addition to the emphasis on keeping young children well given by the weighing and measuring test, the bureau in cooperation with the women's committee of the Council of National Defense, the Playground Association of America, and 16 other national societies, and the Department of Agriculture Club and Demonstration Directors carried on in the summer and autumn of 1918 a Recreation drive on behalf of wholesome recreation for older children.

Child labor.—Forty-five States, New York City, the District of Columbia, and Hawaii organized special committees for Back-to-School and Stay-in-School drives which are continuing with increasing momentum. This was done because of the recognition that the true way to eliminate child labor is to substitute school.

Standards of child life.—As the crowning activity of Children's Year it was decided to hold a Conference on Child-Welfare Standards with the purpose of getting, by a consensus of expert opinion, a statement of "irreducible minimum" standards as suggested by President Wilson in his letter approving Children's Year. It was believed that such a statement would give a point of departure, not a goal. It would give a definite working basis and be a consistent and forward-looking contribution to the work. An allotment by the President from his fund made possible this conference, which accordingly took place in May. The first session was held in Washington. A limited number of invitations were sent to representative authorities for a round table conference upon the various aspects of child welfare. Following that, regional conferences were held in Boston, New York, Cleveland, Chicago, Minneapolis, Denver, San Francisco, and Seattle, which were attended by large and representative audiences. The public press gave them excellent reports.

Because of the extraordinary work for the protection of childhood carried on abroad under war conditions, the severity of which this country did not experience, it was decided to invite a small number of foreign authorities to attend the conference. Guests accepted from England, Belgium, France, Italy, Serbia and Japan, and their assistance is most gratefully acknowledged. Members of the party not only attended the conference in Washington and all regional conferences, but also addressed representative bodies such as the Woman's Trade Union League, the Southern Sociological Congress, the National Conference of Social Work, Civic Associations, etc.

At the Washington conference standards of child welfare were worked out and submitted by committees appointed for that purpose. They have been printed and widely distributed for discussion, criticism and comment being invited. In the light of all the suggestions received they have been revised by a special committee appointed by the Washington conference.

Much interest has been shown in these standards and it is hoped that they may prove a strong influence in securing attention for further needed legal protection for children by the Federal and State Governments. Among measures urgently important for strengthening the young of the Nation are two which are really implicit in the standards:

1. Federal aid to States for universal elementary education, for the prompt and immediate abolition of illiteracy and of child labor.
2. Federal aid to States for the universal public protection of maternity and infancy.

In this summary, attention will be asked for the second measure only.

Public protection of maternity and infancy.—The Children's Bureau series of reports on infant and maternal mortality in urban and rural areas has for the last seven years steadily accumulated evidence of a high degree of annual wastage of life and vigor. The studies show that poverty and ignorance are yokefellows and that civic responsibility for decent conditions of living is only beginning to reach an expression which can help to ease the burden.

More than 16,000 mothers die yearly from causes incident to child-bearing, and ill health is suffered by a vast number of others from the same cause. These deaths and disabilities are now known to be needless; among women who can command adequate care their proportions are greatly reduced. Over 200,000 babies less than a year old die annually. These infant deaths are controllable almost without exception. Poverty is a constant condition of the highest infant mortality rates, and the rates steadily improve as income increases to a good living standard. In the interest of humanity and of sound national economy adequate care for maternity and infancy should be universally available. The lessening rates of infant mortality in the United States for the last few years are encouraging. They indicate the effect of many scattered public and volunteer activities for infant welfare, but the reduction is far too slow. New Zealand still shows a much lower rate than our best States, and the United States is eighth from the head of the list of countries judged by the favorable character of their infant mortality rates. The best available world figures for maternal mortality show that the United States is fourteenth down the list; that is, the life of the mother is safer in thirteen other countries than in the United States. The neglect of maternity is shown by the fact that in a thirteen-year period during which deaths from communicable diseases have been reduced—typhoid-fever deaths cut in half, croup and diphtheria reduced two-thirds—the deaths of mothers from causes incident to childbirth show no diminution, although these causes are also known to be in great measure controllable.

Based upon American studies and upon the experience of various other countries, a measure believed to offer a practicable plan for reducing the present losses of life and vigor was proposed in the last annual report of the Children's Bureau. The essential feature of the proposed plan is that the United States Government shall cooperate with the States in providing a joint fund in each State to be used so as to afford effective means for the protection of maternity and infancy. Mothers and babies are the same in the rural community and the city areas. They need the same care. The rates of death are approximately the same. The proposal therefore is of general application.

The principal features of such care are—

- (1) Public-health nurses.
- (2) Accessible hospital care and medical attention.
- (3) Teaching and practical demonstrations for mothers of the hygiene of maternity and infancy and of the household arts essential to the well-being of mother and child.
- (4) Accessible consultation centers, or well children's clinics for the periodical examination of young children in order to secure their most vigorous development.

It will be seen that such a program involves more than medical and nursing care. For example, the State university extension divisions and departments of home economics are already doing excellent pioneer work and can greatly assist the plan. The public libraries, especially those in smaller towns, and the traveling libraries are already undertaking an educational function in the careful distribution of pamphlets and literature for mothers.

Such a partnership between the Government and the States already serves agriculture through the Smith-Lever law and vocational training through the Smith-Hughes law, and is creating through the joint work of the Government and the States a new and cleansing knowledge of social hygiene, and is slowly removing the isolation of the remote ranch and farm family by the good-roads act. On exactly the same plan of Federal aid stimulating and standardizing State and local activities, the well-being of mother and child, a basic national economy, may be secured.

It may be suggested that health insurance schemes with maternity benefits are in operation in European countries,¹ and the question is raised as to whether they offer a satisfactory method of meeting the need. The experience of England seems to show that a general measure of such character as that outlined above is absolutely essential in a country of modern standards of health and comfort even when health insurance exists.

The health-insurance law of the United Kingdom went into operation in 1911. It provides a benefit of \$7.50 upon the birth of a child for the wife of an insured man and double that sum if the wife herself

¹ Maternity Benefit Systems in Certain European Countries, by H. J. Harris. Children's Bureau publication.

is insured and the wife of an insured man. Yet since the insurance law went into effect two measures have been passed by Parliament permitting grants in aid to sanitary districts for the protection of maternity and infancy. They are clearly an expression of a belief that no provision already in existence is adequate.

As applied to the United States, it may be said with certainty that any public provision for safeguarding maternity and infancy must be universal. It must afford a dignified service which can be utilized with the same self-respect with which the mother sends an older child to the public school. It must not be compulsory. In this connection Australian parliamentary reports of 1917 are of interest. For the last seven years¹ the Australian Commonwealth has allowed for each living birth the sum of \$25 and the acceptance of this allowance is general. Yet the report on infant mortality submitted to the Australian Parliament in June, 1917, by the committee concerning causes of death and invalidity in the commonwealth strongly urges the adoption of a general scheme of practical measures, such as are in force in New Zealand and elsewhere, as a means of lessening the infant mortality rate.

When the matter is carefully examined it becomes clear that only a plan of public cooperation making generally accessible instruction in public-health nursing and medical and hospital care offers the safeguards of life and vigor which are needed.

Necessity for food studies.—The mounting cost of living and the effect on infant feeding and the dietary of young children is illustrated by the Children's Bureau studies of the amount of milk consumed by children in three cities—New Orleans, Baltimore, and Washington. Attention is called to the importance of milk in the dietary of the growing child in Bureau Publication No. 35, *Milk the Indispensable Food for Children*. These studies indicate that milk has a value as a food which can not be measured by its cost and show the danger many parents are incurring by taking milk away from young children because they consider the price prohibitive.

National attention has been drawn to the subject of food, and especially to its relation to the nutrition of children, by the increase in the price of the essential foodstuffs such as milk. The fundamental factors in child health other than food are less well understood, but it is most important to secure and to popularize this essential knowledge.

In fact little headway has been made in ascertaining what are the irreducible minimum developmental requirements of a growing child. There have been, as far as we know, no intensive studies or surveys to ascertain what a child ought to have in order to be reared properly, a need that is strikingly brought out in Mr. Ogburn's development of

¹ Since Oct. 10, 1912.

"The financial cost of rearing a child." As Mr. Ogburn adds "this is a most important question—and no doubt others will develop it."

Considering the general marked advance in the price of food, clothing, and other items in the family expenditure and the possibility that the high cost of living may endanger the health of the growing child if economies are made in the food, clothing, and other commodities used by him, it would seem vital to the welfare of our children that intensive and general surveys be made at this time to ascertain what are the irreducible minimum requirements of a growing child and how their attainment is being affected by high prices.

Such studies of actual living conditions require a considerable period of time. They must be made by trained investigators with the aid of nutrition experts and should be interpreted into practical terms for the use of the average mother. They must be related to actual living conditions within the household and to outside conditions such as climate, situation, size of community, available home products, and accessible markets.

The timeliness of such investigations is apparent to any one interested in child welfare.

Children of Territories and islands.—The lesson of the present time is that no class can be protected alone; that only universal provisions are equitable or socially prudent. Illiteracy and child labor flourish together in rural areas in the United States and efforts are being made to eliminate them together. They are found together in the islands which are within the protection of the United States. Porto Rico according to recent reports has special problems of child welfare, as have the Virgin Islands, Hawaii, and the Canal Zone.

For the past seven years the bureau has been occupied with investigations of "matters pertaining to the welfare of children and child life" in continental United States. In the first year of its existence it was asked by the then Secretary of War to make reports upon the children of the islands under the protection of the United States, but the resources of the bureau have never permitted this expansion. Various considerations, however, urge study at this time of the needs of those children who are indeed legally under the protection of the United States yet who are so far removed from American observation that comparatively little is known of them. Especial attention is called to the children of Porto Rico and of the Virgin Islands.

The Virgin Islands: The Virgin Islands were purchased from Denmark in 1917, and an act passed by Congress provided a temporary government for them. Little can be presented as to living conditions in the Virgin Islands, but thanks to the census taken by the United States Census Bureau in 1917 certain facts are available which are recognized as indicative of the degree of well-being enjoyed by a people.

The population of the Virgin Islands in 1917 was 26,051, of whom 7,321 were under 14 years of age. At the date of the last Danish census, in 1911, the population was 27,086. This shows a decrease of 4 per cent in the six intervening years. The excess of deaths over births and the excess of emigration over immigration are submitted by the census as explaining a decline in population which has been general since 1835, when the population was 43,178.

In 1917 it was found that 24.9 per cent of the population 10 years of age and over was illiterate. The proportion of illiteracy in continental United States, the purchasing country, was 7.7 per cent in 1910, a rate known to be alarming; and of Denmark, the selling country, 0.2 per cent according to latest available figures for that country, which give the rate for 1907.

The rate of infant mortality is not given in the printed census report but the text contains this statement: "The present high infant mortality rate probably is accounted for mainly by the fact that most of the parents are poor and dependent on their daily wages for a meager livelihood; by the fact that 58.7 per cent of the married women and women living with their husbands by mutual consent were engaged in gainful occupations in 1917, a large proportion of them as field laborers * * *."

The proportion of the women of the Virgin Islands of different age groups gainfully employed are as follows:

Between the years—	Per cent.
14 and 15.....	35. 3
16 and 20.....	63. 7
21 and 30.....	73. 4
31 and 44.....	69. 0
45 and 64.....	63. 0
65 and over.....	28. 6

The proportion of mothers in each group employed is not stated, but since not less than 63.7 per cent of every age group of women between 16 and 45 are employed, clearly the mothers of young children are largely included among those who work for pay.

It is plain that under the four heads enumerated a depressed level of existence is revealed. While many factors, chiefly economic, are involved in the decline of these islands, it is believed that a careful study of the conditions surrounding the mothers and children would be of material aid in proposing methods of securing more satisfactory living conditions.

Porto Rico: By the ratification of the treaty of 1898 the island of Porto Rico was placed in the hands of the United States Government. According to the census of 1910, the population totaled 1,118,012, representing an increase of 17.3 per cent in 11 years. Of this number, 893,392, or 79.9 per cent, were living in rural areas, while only 224,620, or 20.1 per cent, were recorded as living in cities and towns. This

indicates that the problems which affect rural communities are the problems which affect, to a great extent, the entire island.

At the time of this census the density of the population per square mile for the size of the island was more than 10 times as great as that of the United States proper.

In 1910 the percentage of illiteracy for all classes 10 years of age and over, for both sexes, was 66.5 per cent, or practically two-thirds of the population of that age. This showed an improvement over 1899, when for the same classes it was 79.6 per cent. In that year (1899) the percentage of illiteracy for all children between 10 and 14 years was 82.1 per cent; in 1910 this dropped to 49.2 per cent. Despite this improvement, the rate is alarmingly high when we compare the figures for another island possession, Hawaii, for 1910, where the percentage of illiteracy between 10 and 14 years of age is only 3.2, and for the age group between 15 and 19 years, only 13 per cent, as compared to 59 per cent for Porto Rico.

In comparison with the United States, France, Germany, England, and Sweden, Porto Rico represents a very high birth rate. But this is accompanied by a high infant death rate. In 1916-17, the infant death rate was 199; in 1917-18 it was reduced to 173.4.

The report of the Governor of Porto Rico for 1918 states that the reform school is still overcrowded, owing partly to the large demands made for space for boys under sentence by the juvenile courts. Some improvements and enlargements have been made since 1917. The average number of boys in the school for 1917-18 was 156, but the number has lately reached 200, the maximum capacity of the school, but this is not sufficient for the need. From January 1, 1917, to June 30, 1918, 452 children came before the juvenile courts. Nearly one-third of this number were born out of wedlock; more than half never attended school, and of those who did, very few had passed the fourth grade; 77 were homeless.

The most serious drawback to the effectiveness of the juvenile-court law has been the lack of adequate facilities to take proper care of delinquent children. The minimum needs according to the governor's report are a temporary detention home for each juvenile court, a separate home for delinquent children, and an institution to care for the abandoned children. This statement is corroborated by the following:¹

According to the last report of the insular chief of police, it is estimated that there are in the island of Porto Rico at the present time about 10,000 homeless children under 12 years of age who live by whatever means they are able, many of them begging or stealing, and most of them having no permanent lodging place, sleeping at night on boxes or on door steps, or wherever they happen to find a lodging place secure from the rain. These children are for the most part deserted and abandoned children of illegitimate

¹ Fleagle, Fred K.: Social problems in Porto Rico, p. 32.

parentage, or orphan children whose parents have left no provision for their care and education, and they constitute a fertile soil for the implanting of criminal tendencies and are ready material for older people of criminal habits.

BUREAU OF NATURALIZATION.

The work of the Bureau of Naturalization during the past year shows more conclusively than ever before the lack of relationship between citizenship and immigration. During the past year immigration was at its lowest ebb, while the converse was true of applications for naturalization. In the last fiscal year there were 235,894 petitions for naturalization and 346,827 declarations, making a total of 581,730 aliens who took the initial or final steps toward securing citizenship in this country.

The number of admissions to citizenship during the past year was larger than in any preceding year, amounting to 217,358. Leaving out of consideration the year 1918, this was a far greater number than were admitted in any two years during Federal supervision. Military statistics show 128,335 aliens who acquired citizenship after they had assumed the military uniform of the United States. Of 107,559 civilian petitions filed during 1919, 33,251 were filed during the last quarter and could not come to maturity because of the requirement that petitions be posted not less than 90 days before hearing. This left a total of 74,308 petitions filed during the year that could mature. During the last quarter of the fiscal year ended June 30, 1918, there were 34,233 petitions which failed to mature until after July 1, 1918, making a total of 108,541 petitions eligible for hearing during the fiscal year. Of these 89,023 were admitted, leaving a total of 19,518 who failed to receive a final favorable hearing. There were 13,119 petitions denied during the year, leaving 6,399 that were continued. In addition, 38,288 petitions filed prior to the beginning of the year became due for hearing but for various reasons were continued, making a total of 44,687 continuances of petitions for naturalization during the year. In a few cases legal technical requirements were the causes for the unfavorable action. The majority of those not favorably acted upon were continued merely to give the candidates an opportunity to avail themselves of educational facilities now offered in 2,240 communities of the country through the public schools. The number of continued cases is proportionately increased as the public-school facilities become more firmly established in the various foreign communities where applicants for American citizenship reside.

The number of declarations of intention filed is 346,827—less than in the fiscal year 1917 but considerably more than in 1918. However, reports by field officers indicate that throughout the country there are many foreigners unable to file their declarations of intention

because of lack of facilities in the offices of the Naturalization Service and of the clerks of the courts exercising naturalization jurisdiction.

Forty-five certificates of naturalization were canceled and 6 persons convicted for violations of the naturalization law. Five of these cancellation suits were instituted under the provisions of the act of May 9, 1918, and 40, which were instituted prior to July 1, 1918, under the provisions of section 15 of the act of June 29, 1906.

Under the increased authority of the bureau contained in the act of May 9, 1918, the naturalization work was extended to the war camps prior to June 30, 1918, and intensively carried on in them until after the armistice. From that time demobilization gradually lessened this work in the general camps and produced an ultimate discontinuance of naturalization of soldiers, with the exception of those camps in which the returning soldiers were assembled.

FINANCES.

The Bureau of Naturalization is one of the few self-sustaining branches of the Government. Its revenues from naturalization fees during the year were \$599,087.97; the cost of administration was \$812,056.38; showing that the expense of administration during the past year was \$214,968.41 in excess of the revenues from naturalization fees. This is the first time in the history of the bureau that its expenditures have been in excess of its revenues. The total expenditure for administration since its creation was \$4,109,321.64, while the total revenue from naturalization fees was \$4,648,768.44, showing a net total of \$539,446.80 excess revenues for the entire period of Federal supervision.

SPECIAL AMERICANIZATION WORK.

The fifth year of the Americanization work of the Government, carried on under general and specific acts of Congress, was crowned with greater success than any previous one. There was a steady increase in the number of communities pledging cooperation with the Federal Government through the Bureau of Naturalization in providing facilities for the educational training of those who seek citizenship through the naturalization law. Four hundred and thirty-eight new communities, making a total of 2,240, have pledged themselves through the public schools to reorganize their school systems in order that these incoming members of the body politic may be equipped for the responsibilities which they desire and which the welfare of the Nation clearly requires them to assume.

The striking feature of this work is the development of the new element of attendance at these classes. Heretofore, with few exceptions, they have been carrying an enrollment of foreign-born residents only. The percentage of the student body seeking citizenship has ranged from 20 per cent in the first years to more recent instances of

100 per cent attendance of candidates. Under the influence of the communities in which they live and attend the public schools non-candidates have applied for and secured their first or final naturalization papers. The particularly striking new element in the personnel of these classes is the presence of illiterate adult Americans. Reports of 166 superintendents of schools show the organization of 840 classes, 68 of which were holding day sessions and 772 evening sessions. In an enrollment of 15,874 there were 77 classified nationalities reported. The four leading nationalities were Italians, Poles, Portuguese, and Americans. The Italians represented 9.4, Poles 8, Portuguese 4.3, and Americans 4 per cent. The causes leading to the attendance of Americans in these classes primarily organized for the training of the foreign-born are many and need not be enumerated here. The principal cause is doubtless to be found in the fact that for the first time in the history of the country there has been an organization of classes where the illiterate adult American can pursue his education in association with other adults. Heretofore the school systems of the country have been organized solely for the junior element of society. Under the law which has authorized the Government to promote the training and education of candidates for citizenship, organization of public-school systems all over the country has been effected in virtually every community where foreigners live and are candidates for citizenship, and this has offered means heretofore unprovided for illiterate American men and women to overcome the handicaps of life which circumstances in their childhood forced upon them. In this manner machinery has been established by which the problem of illiteracy may be at least partly solved.

Another conclusion that is forced upon the public mind is that men and women aged 30, 50, or 60 years or more may be enabled to acquire a reading, speaking, and writing knowledge of the English language. In the reports referred to from the 166 public-school systems there were 131 men and women over the age of 60 years in attendance, 352 between the ages of 51 and 60, 3,698 between the ages of 31 and 50, 6,059 between the ages of 18 and 31, and 5,634 not classified by age.

It is under specific authority that the Bureau of Naturalization has definitely assumed a new relationship with the foreigner. This authority is found in the language of the act authorizing the promotion of the education and training of the candidates for citizenship by the public schools. Increased public interest has manifested itself through employers of foreign laborers in all parts of the country. Employers who previously had no other relationship than that of employer to employee have felt the necessity for sentiments of interest in and loyalty to this country and have appealed to the Bureau of Naturalization to provide the means by which foreign-born employees

desirous of seeking American citizenship may do so at their places of employment. Representatives of industry, either individuals or committees representing the employers and employees, have been organized and trained in the work of preparing naturalization papers, ordinarily performed only by the clerks of the naturalization courts. As a result of the facilities brought close to hand many thousands of foreigners who under the previous lack of organization had remained inactive have expressed a desire to declare their intention. The creation of these facilities, with the resultant applications for citizenship submitted to the naturalization examiners for examination and the clerks of courts for filing and execution, precipitated a condition not previously reckoned with. The offices of the clerks of courts and the examiners were overwhelmed, and the congestion of applications compelled a virtual cessation of the filing of naturalization papers, solely because the means had become inadequate. A condition of affairs in naturalization matters never before experienced in the history of the country had been created. Aliens desirous of filing their naturalization papers at a time when their action was expressive of the highest sentiment of loyalty discovered that the machinery of the Government, both State and Federal, was powerless to assist them.

Communities have paid for the cost of printing the preliminary naturalization forms; individuals and organizations of a patriotic, philanthropic, religious, commercial, or educational nature have lent their aid to the relief of this appalling situation; yet all to no purpose. Governmental aid of an expert character was insufficient to meet the national need. Communities determined upon an all-American organization have had their plans deferred, if not frustrated, by lack of governmental power by which they might be guided, notwithstanding that the examining force exerted itself to the maximum and the public gave to the utmost its voluntary assistance. So great was the increase in this work that it became necessary in the judgment of the Department to establish a specific division in the Bureau of Naturalization to exercise immediate supervision over it. The Division of Citizenship Training was therefore created and a chief, entitled the "Director of Citizenship," was placed at its head.

During the past year 117,000 copies of the citizenship textbook compiled from material used by the public schools and descriptive of the functions of the Federal Government, were distributed for the use of candidates for citizenship attending the public schools. This book, admittedly inadequate both as to mechanical construction and subject matter, has, nevertheless, been acclaimed throughout the United States by the public-school authorities. It has been submitted to a committee of educators representing the public schools and universities engaged in the solution of the problem of teaching the foreigner. New material has been placed in the hands of this committee, which is

working under the supervision of the Director of Citizenship to the end that there may be issued with the coming school year a book that will be an acceptable standard course in citizenship training.

Notwithstanding the influenza, which adversely affected the public schools as well as all other activities during the past year, there were 3,000 petitioners for naturalization in attendance upon the public schools who received certificates of graduation issued jointly by the local school authorities and this Department through the Bureau of Naturalization. These few thousands represent only a small number of those actually entitled to such recognition. Certificates of proficiency have been authorized and will be issued during the coming school year to those aliens who have only declared their intention and to whom recognition for their hard-earned merit is justly due. A certificate of recognition of the public-school system has also been authorized for issuance to the public schools of each of the communities as an indorsement by the Government of their work in training the foreigner for citizenship responsibilities.

In carrying on this work the Division of Citizenship Training cooperates with the directors of Americanization of the various cities, Americanization committees of chambers of commerce, labor organizations, and industrial concerns, with educational, religious, patriotic, philanthropic, and other organizations having for their objective the welfare of the Nation as it bears upon the individual foreigner. Without their aid this work, which has reached such a high state of development, would have been seriously handicapped. By their aid the conviction that each community should be an all-American community is gradually but surely making strides toward realization.

NATURALIZATION OF SOLDIERS AND SAILORS.

During the past year the important work of vesting with American citizenship that great patriotic body, the loyal foreign-born soldiers making up a large part of the American forces, both military and naval, went steadily forward under varying conditions of difficulty. American citizenship was granted to 128,335 soldiers in the Army camps and adjacent courts throughout the United States. These soldiers were relieved from all the general requirements of the naturalization law, and, because of their adoption of the uniform, accorded full American citizenship. They were also relieved from paying the \$5 fee where they had made no declaration of intention and of the \$4 fee where the declaration of intention had previously been made. This represented an actual saving of \$513,340 in the latter case. The number of those in the former class is unknown and therefore can not be stated. The first report of the provost marshal general, dated December 20, 1917, showed 76,545 foreigners in the Army who had not declared their intention to become citizens of the United States.

The number afterwards inducted into the service without the declaration of intention is not known. To these 76,545 the requirement for a previous declaration of intention was waived, thereby saving the sum of \$76,545, a total, as nearly as can be ascertained, of \$589,885 saved to soldier applicants. This was nearly as large an amount as the total naturalization fees (\$597,087.97) collected throughout the United States from all other aliens. None of the attendant delays in naturalization proceedings were required of them, as the law permitted the immediate hearing of their petitions for naturalization upon being filed. As stated in the last annual report, the law intended to extend to every alien wearing the American uniform the opportunity of American citizenship.

UNITED STATES EMPLOYMENT SERVICE.

WAR ACTIVITIES.

Organization.—On January 3, 1918, the date on which the United States Employment Service was established as a separate branch of the Department, there were in existence but 96 branch offices, operating in 36 States and the District of Columbia. In five other States, seven offices were in operation to which Federal officers were assigned under the cooperative supervision of the Department and the respective State commissioners of labor. In the remaining eight States the Federal Government had no employment agencies. The administrative force in Washington numbered only 12 officers and employees, and the field force approximately 200. By July 1, 1918, there were, in round numbers, 350 offices, with a paid personnel of about 1,700, while the administrative force in Washington had grown to 300. In many of the States the offices are maintained in cooperation with State or municipal agencies.

In addition to the regular personnel of the field force, the organization contained three groups of special volunteers, viz: State Advisory Boards, Community Labor Boards, and the Industrial Advisers. For a short time while these boards were in process of formation there was also in operation in each State a fourth board known as the State Organization Committee. Of these groups of volunteer workers, the State Advisory Boards and the Community Labor Boards are still functioning.

The State Advisory Board in each State is composed of the Federal director of employment as chairman, two representatives of labor, two of management, and two women, one of the latter to represent the workers and the other to represent management. The principal functions of these boards during the war were: (a) To advise the Federal director of employment in matters of policy and to assist him in choosing the members of his own staff and the officers to be placed in charge of the main local offices, including the superintendents of

women's divisions; (b) to recommend removals of said officers, where deemed advisable for the best interest of the service; and (c) revision and approval of the apportionment among the communities of their respective States of the quota assigned thereto for recruiting purposes.

The Community Labor Boards are composed of five members, representative of the United States Employment Service, local employers, and local employees. The number of Community Labor Boards organized and in operation throughout the United States at the end of the war was 1 644. The functions of the Community Labor Boards during the war were as follows:

(a) Decision of all questions concerning recruiting and distributing labor in the community, subject to appeal by any member to the State Advisory Board; all decisions of both State Advisory Boards and Community Labor Boards being subject to regulations issued and approved by the Director General, acting on the advice of the War Labor Policies Board.

(b) Dividing up the total of the community's quota, assigning to industries and employers in nonwar work the proportionate share which each should contribute.

(c) In distributing available labor supplies among local war industries it was the duty of the Community Labor Boards to consult the local employers' committee, which was represented on the Community Labor Board.

(d) The Community Labor Board had no executive duties, but so far as possible assisted in recruiting labor by securing harmonious and cooperative action on the part of employers and employees.

The particular duty of the industrial advisers selected by the Department of Labor was to furnish the district draft boards information as to the needs for skilled labor and the supply in each community, to assist the district boards in arriving at their decisions as to whether or not individuals were performing work necessary to the effective operation of the military forces.

From this synopsis of the form of organization of the Employment Service there will be noted the magnitude and importance of the task of creating it; but when it is considered that, coincident with this work of organization, actual and efficient employment activities have been carried on it will be seen that the demands upon the service have been exceedingly great.

Centralized recruiting and distributing of unskilled labor.—One of the most important tasks allotted to the Employment Service was the vesting in it of exclusive authority for the recruiting and distributing of unskilled labor in war work. This authority was recommended by the War Labor Policies Board and submitted to the President on June 15, 1918, by the Secretary of Labor. The President, on June

17, 1918, issued a proclamation urging all employees engaged in war work to refrain, after August 1, 1918, from recruiting unskilled labor in any manner except through this central agency (the United States Employment Service), and urging labor to respond as loyally as theretofore to any calls issued by that agency for voluntary enlistment in essential industry.

The benefits of this program for centralized labor recruiting were seen in the reducing of labor turnover, in the transference of unskilled labor from nonwar work to war work, and in the direction of unemployed and partially employed wage earners to industries closely allied with the prosecution of the war.

The results were not accomplished, however, without imposing a heavy burden on the service. A system was set up for advancing transportation for the men from a revolving fund. This necessitated the sending of guards or pilots with the shipments. Pressure was brought to bear, in some cases, on plants to have competent employment managers installed so that all questions concerning the conditions under which the men worked and lived might receive proper attention.

As labor conditions became critical, arrangements were made with various agencies, such as the War Industries Board and the United States Highways Council, for restricting nonwar work because of the labor shortage. Under the regulations established by the Department, advertising for unskilled labor was restricted and controlled. Toward the end of the period little advertising was being done, except as authorized by the Department. Private employers, almost without exception, supported the entire program.

There were so many war projects calling for unskilled labor that a list of them would resemble a directory of all the camps, cantonments, munition plants, shipyards, and other war industries in the United States. More than 40,000 employers, engaged wholly or partly in war work, reported regularly to the service concerning their labor requirements. The urgent need of these large plants and others like them for thousands of unskilled laborers, most of whom had to be recruited from distant States, owing to the depletion of the labor supply in the vicinity, gave ample proof of the necessity for a National centralized employment agency. Laborers for some of the eastern plants were brought from as far west as Utah and Arizona.

Skilled labor.—While the regulations covering the central recruiting program placed no restrictions upon employers engaged in war work in recruiting their own skilled laborers, other than that they should avoid interfering with men who were already engaged in other war work, still employers as a rule followed the same plan in securing skilled labor that had been promulgated by the service for recruiting unskilled labor.

In September, 1918, there was established a Facilities Division of the War Industries Board. The membership of this division was composed of representatives of the War Industries Board, the Army, the Navy, the Emergency Fleet Corporation, the Railroad Administration, the Housing Corporation, and the Department of Labor. The chief of the Clearance Division of this service represented the Department of Labor in the work of the Facilities Division. Under the program adopted no construction project in the United States, whether for war or nonwar purposes, could be authorized without the approval of the Facilities Division. That division also secured the adoption of a general resolution to the effect that no new projects could be approved unless it was shown affirmatively that laborers were available for carrying on the work.

Farm work.—The importance of maximum food production during the war led the Department to devote special attention to farm-labor conditions. It secured the active cooperation of the Post Office Department, the Department of Agriculture, and the National organizations of farm and dairy interests. It likewise secured the cooperation of newspapers, motion-picture concerns, commercial organizations, rural telephone lines, the canning industry, and many unofficial organizations, both national and local, with a view to giving the best possible attention to the farm-labor needs of the country. Arrangements were also made for the importation of labor from Mexico and the Bahama Islands.

Saving the wheat crop of 1918, in the great belt extending from Oklahoma through Kansas, Nebraska, and South and North Dakota, was of the utmost importance, and the Employment Service took early steps to meet conditions by conducting a survey to ascertain the approximate number of harvest hands that would be needed from outside sources. In view of the serious shortage of labor that existed in practically all parts of the country efforts were limited to obtain the needed laborers locally or from adjoining States. That the efforts of the Department were successful is shown by reports received from Oklahoma and Kansas to the effect that not a bushel of wheat was lost through lack of labor.

Harvest hands were sent sometimes to the farmer himself, but as a rule were directed to the county agricultural agent or other community representative for distribution. Much valuable assistance was given by local organizations in enrolling emergency volunteer workers. Such workers rendered exceedingly valuable service, particularly throughout eastern Kansas. In Kansas City alone, through the efforts of the chamber of commerce, more than 10,000 men registered as volunteers for emergency harvest work.

Women's work.—When the Women's Division was established in January, 1918, there were in operation but nine branch offices

devoted exclusively to women workers. During the first six months of 1918, 57 separate women's divisions were added by creation of new offices or absorption of State, municipal, or other public employment offices. At a time when "war work" and "entrance of women into industry" had already become popular catch words, much of the work of the United States Employment Service offices for women actually consisted of finding jobs for those dependent on their earnings who were thrown out of work by lessened production. Reduced consumption of many articles, particularly those known as luxuries, first to be dispensed with by the buying public, forced many out of accustomed work. Large numbers of women were affected. They ranged from embroiderers and expert power-machine operators on fine garments to artists, writers, and musicians.

With the creation of the War Labor Policies Board and the Woman in Industry Service of the Department in May and June, the program of the Employment Service in handling women was simplified. "Centralized policy and decentralized operation" led to the abandonment of the Federal Women's Division in order that female labor, like railroad, farm, or technical workers, might be handled as local or State conditions made most feasible. There was provided, however, a woman assistant to the Director General, to have supervision over all matters concerning the employment of women. Sections for women farm laborers, for professional women, for juvenile workers, for reference information, for publicity, for interstate clearance, and others were created to function through the proper division of the Administrative Offices.

Expansion of the number of women's divisions kept pace with the rapid development of the service. Many noncommercial offices with trained personnel linked themselves with the Federal organization. Most offices handled all types of women; others were devoted to a single type, such as domestic, industrial, or professional. Offices for placing both men and women of technical and professional types were developed in some cities. Efficiency and method varied widely. Many offices developed a real technique.

By October 1 control of the employment of women for war needs could have been taken over by the Employment Service at any time such need dictated. Besides the numberless general offices handling both men and women in small cities, on November 11 women's divisions were operating in 40 States, with a variation in number from one each in Arizona and Vermont to 20 in Illinois and 46 in New York. Women were working on over 500 Community Labor Boards. Nearly 368,000 women were reported placed by the United States Employment Service during the 10 war months of the year. This number is equal to about 13 per cent of all placements made during that period.

Public Service Reserve.—The Public Service Reserve was the recruiting arm of the United States Employment Service. It supplemented the employment offices with 15,000 enrollment agents who reached down into the smallest villages and hamlets to tap potential supplies of wage earners. The reserve has furnished the Army, Navy, and executive departments of the Government with thousands of men, mostly of the higher skilled types, such as engineers, technical experts, and skilled mechanics. The Emergency Fleet Corporation has secured from its registration many thousands of skilled men for shipbuilding. Hundreds of officers of particular technical qualifications have been furnished the Army without necessitating a long search on the part of the War Department for the type desired. Many of the civilian administrative heads of the war emergency activities were secured from the lists of the reserve. A few of the special services performed were as follows:

Over 1,500 aviation motor mechanics were enlisted through the reserve in the short space of five weeks, in January and February, 1918, for Gen. Pershing. The names of over 4,500 railway men were submitted to the Division of Military Railways for induction and enlistment into various locomotive and engineering regiments; 470 to the Tank Corps; and 472 in a special drive for tower men for the Navy. The reserve also cooperated most helpfully in the special drive made throughout the country by the Ordnance Department for all kinds of civilian help. It registered and classified a total of more than 300,000 men of various trades. Without doubt production has been appreciably increased and efficiency improved by the ability of the reserve to furnish on short notice men of almost any qualifications.

Boys' Working Reserve.—During the year the Boys' Working Reserve continued to enroll boys of high-school age, principally in its agricultural division. Some of the notable mobilization records are as follows:

In Illinois 21,000 boys worked on farms; in Connecticut, 10,000 boys helped to care for the largest acreage of food crops in the history of the State; in New York State 12,000 and in Indiana 15,000 boys were sent to the farms.

In many instances where special crops were jeopardized by the lack of adequate labor to harvest them they were saved through the prompt assistance of the boys recruited by the reserve. Such was the case in Michigan with regard to the sugar-beet crop, where a large part of the planting would have had to be plowed under had it not been for the timely assistance of the reserve boys. In Georgia reserve boys saved by their sole efforts a valuable apple crop; across the continent in Oregon they helped to save the berry crop. In California a similar invaluable assistance was rendered by the organization in harvesting the immense acreage of fruit crops, including cherries, apricots, plums, and grapes.

SPECIAL SERVICES.

Stevedores and marine workers.—One of the special branches of the United States Employment Service in making more efficient the conduct of the war was the Division of Stevedores and Marine Workers. In normal times men of these occupations worked on certain docks and in certain localities, and it was a common sight to see groups of hundreds of unemployed longshoremen waiting for employment at their favorite dock or locality when at the same time there was a real need for men at other points. While these conditions were well known it required the exigencies of war to develop the machinery for remedying the situation.

Conferences were held in New York by the representatives of the Department, of the longshoremen, the Army, the Navy, Shipping Board, Railroad Administration, and ship owners. It was agreed that there should be formed an elastic labor pool, and that the United States Employment Service should organize and direct the activities of the new division. The longshoremen readily agreed with the proposed arrangement—that the emergent requirements of war made it necessary to change the old order of things, and that henceforth men would shift not only from one dock to another near by, but would go from one side of Manhattan to the other, from Hoboken to South Brooklyn, should it be found necessary, and, as one of the representatives of the longshoremen said, from one port to another, making the Atlantic coast one dock.

There were established in New York seven branches of the Stevedores and Marine Workers' Division. Other branches were established at Philadelphia, Baltimore, Norfolk, Newport News, Charleston, S. C., Mobile, New Orleans, Galveston, Boston, Portland, Buffalo, Seattle, and Duluth. That the service was a success, can be measured by the statement frequently made that the port of New York increased its efficiency at least 30 per cent.

Shipyard labor for the Puget Sound district.—In January, 1918, there was established at Seattle, in cooperation with the Emergency Fleet Corporation, a central office for the recruitment and distribution of labor for the shipyards in the Puget Sound district. Under this plan, the central office took charge of the securing and distributing of all persons required for war emergency work in that district. The executive control of the operation of the office and the carrying into effect of the plan were in charge of the representative of the Department.

Mining Division.—The Mining Division of the United States Employment Service was created to take charge of the recruitment and distribution of the mine labor. Experienced mining men, thoroughly conversant with all phases of the mining industry, representing both mine workers and mine operators, were selected as the

executive officers of the division. After conferences with representatives of the Fuel Administration, the United Mine Workers of America, coal operators' associations, and producers of metals, the Mining Division found that there was a shortage of labor in practically every important coal and metal producing region in the United States. This shortage was due to two main causes: (1) The abnormal demand for coal and metals; (2) the great number of mine workers who had entered the military or naval service. It was evident that the only source of supply of available mine labor was in nonwar industries to which miners had drifted after leaving the mining field. The problem confronting the Mining Division was to locate mine workers employed in those industries. As a prospective solution of this problem, it was deemed advisable to solicit the aid of the local officers of the United Mine Workers of America. With that object in view circular letters were sent to the secretaries of the miners' local unions, with the result that the names and addresses of more than 15,000 practical miners, engaged in nonwar work, were immediately supplied.

The majority of these men were induced to return to the mines. It may be said to their credit that many of them gave up more agreeable and more remunerative positions than could be obtained in the mines. It is a matter of gratification to be able to report that at the time the armistice was signed very few requests for additional mine labor were being received from companies producing coal or metals in any section of the country.

War placements.—The registrations, applications, references, and placements for the '11 war months in which the United States Employment Service operated, that is, from January, 1918, to November, 1918, inclusive, so far as it has been possible to gather statistics, are shown in the following table:

Month.	Registra- tions.	Help wanted.	Referred.	Reported placed.
1918.				
January.....	82,353	80,002	62,642	51,183
February.....	92,452	92,594	70,369	58,844
March.....	144,156	177,831	118,079	100,446
April.....	195,578	320,328	171,306	149,415
May.....	206,181	328,587	179,821	156,284
June.....	246,664	394,395	221,946	192,798
July.....	282,294	481,033	250,152	217,291
August.....	555,505	1,227,705	500,510	395,530
September.....	531,226	1,476,282	513,662	362,696
October.....	594,737	1,588,975	606,672	455,931
November.....	744,712	1,724,943	748,934	558,469
Total.....	3,675,858	7,895,675	3,444,093	2,698,887

It was impossible to secure statistical data with respect to large groups of persons referred to employment through this service but who did not actually pass through the placement offices. As examples

of these classes, there may be mentioned the thousands of men who engaged in work in the harvest fields, of whom no record could be obtained; the experienced miners who were induced to reenter the mines; the stevedores and marine workers who were transferred in many instances from one place of employment to another without any statistical record being kept of their several employments. The heaviest month of placements occurred in November, 1918, when war labor recruiting and the war industries had attained their greatest momentum. The placements for the month of November alone were over half a million, and, as the foregoing table shows, they had been steadily increasing since the previous January.

POSTWAR ACTIVITIES.

After the termination of hostilities the war branches of the Employment Service were discontinued. The regulations governing the centralized recruiting program were canceled, and the control theretofore exercised over the recruitment and distribution of unskilled labor was withdrawn.

Upon the signing of the armistice many of the large war projects either materially reduced their operations or discontinued them altogether. In this way thousands of wage earners were suddenly thrown out of employment, and to this number were added the discharged soldiers. Fortunately, however, the Employment Service rapidly readjusted itself to peace conditions. Up to the time of signing the armistice its problem had been to secure men for jobs; the situation quickly reversed and it had to find jobs for men. This marked reversal came in the early winter months, when nearly all out-of-door work was suspended and when the farmers were not only not applying for men but had just released all the extra help which had been in their employ during the summer and fall.

In consideration of the labor situation, an agreement was entered into by the Secretary of Labor and the Secretary of War which provided that no war contracts should be canceled without the advice of the War Industries Board. That board looked to the Department of Labor for information as to the manner in which the cancellation of contracts would react on the labor situation, and a representative of the Department acted with the War Industries Board for the purpose of supplying to the military authorities information upon employment conditions.

The War Department and the War Industries Board called upon the Department of Labor for this information in order that contracts for war materials might be curtailed or canceled and the Army demobilized with the least possible danger of serious unemployment during the period of reconstruction. To that end instructions were issued on November 20, 1918, to all Federal directors of the Employ-

ment Service, under the terms of which a survey in 122 cities was undertaken and a statement of labor conditions in those industrial centers telegraphed each week to the War Industries Board. This information was of value in the determination of the effect of cancellation of contracts upon the labor market.

While the number of war workers to be released from industries was large, it was felt that the number of men to be discharged from the Army would have a more serious effect on employment conditions throughout the country, particularly when the plan of demobilization by units was announced by the Army. The importance of this subject caused the Employment Service to invite representatives of the national welfare organizations and Government bodies concerned with demobilization to meet in Washington on December 2, to discuss the method of linking all efforts and machinery for assisting soldiers, sailors, and war workers in finding proper employment. A committee was appointed to draft a plan of cooperative action, which was later adopted. Under this plan, there was formed a central board at Washington, with a representative of the Department as chairman, consisting of numerous governmental and welfare organizations.

Steps were then taken to extend the Employment Service, in cooperation with the above mentioned cooperating agencies, by the establishment throughout the country of Bureaus for Returning Soldiers and Sailors. Over 2,000 of such bureaus were established and, in addition, the Employment Service stationed qualified representatives at the demobilization camps and arranged for supplying to soldiers at embarkation camps in France and on board transports all available information concerning opportunities for employment on their return to this country. Thousands of soldiers and sailors daily sought help through the service in finding employment.

After the armistice several special lines of work were undertaken. Among these were the Junior Section, the Handicap Section, and the Professional and Special Section. The Junior Section was established for the purpose of giving vocational guidance to boys and girls between the ages of 16 and 21. The Handicap Section dealt with the placement of persons handicapped by age or some physical disability. The purpose of the Professional and Special Section was to bring together the highly trained man or woman, such as the engineer, the executive, or the teacher, and the position for which he or she is qualified.

CONFERENCE ON EMPLOYMENT.

On April 14 there was addressed a communication to the governors of all the States inviting them to send representatives to a conference on employment, to meet in Washington on April 23, 24, and 25, 1919.

The purpose of the conference can best be described by quoting the call for the conference:

The purpose of the conference will be to define and establish the most effective form of relationship between National and State employment activities and in general agreement bring out a definite objective toward which all may work to the end that a thorough and comprehensive public Employment Service may be permanently established.

Delegates were designated by governors of 28 States. There were also in attendance at the conference a sufficient number of Federal directors of the United States Employment Service to insure satisfactory geographical representation, representatives of the United States Chamber of Commerce, and the American Federation of Labor.

After three days' consideration and discussion of the subject matters before the conference an outline of a bill to provide for a National Employment System was unanimously adopted.

The conference also selected a subcommittee to draft a bill embodying the provisions and principles contained in the outline. Subsequently the subcommittee met and drafted a bill which the Department approved. This bill, H. R. 4305, was introduced in the House of Representatives on May 31, 1919, by Mr. Nolan, of California.

On June 6, 1919, Senator Kenyon, chairman of the Senate Committee on Education and Labor, introduced in the Senate a similar bill, known as S. 1442.

ADMINISTRATIVE OFFICES.

The form of organization of the Administrative Offices adopted on August 5, 1918, a description of which appeared in last year's report, was continued throughout the fiscal year with only such modifications as were made necessary by the change from a war to a peace basis, and the curtailments due to greatly reduced appropriations.

Division of Operations.—At the beginning of the fiscal year, i. e., July 1, 1918, all matters relating to skilled labor were handled by the Skilled Labor Division and matters relating to common labor were handled by the Common Labor Division. These two divisions were later designated as sections of the Clearance Division. After the termination of the war the division was readjusted to meet peacetime functions, and its name was changed to the Division of Operations.

After the signing of the armistice there came an immediate cessation of the urgent demands for labor, and many persons were thrown out of employment. Large numbers of these were semiskilled persons who during the war had been receiving high pay and were indisposed to return to occupations in which they had been engaged before the war. Many of these demanded employment as skilled mechanics, although

their skill was of the most limited type. The Employment Service communicated with the firms whose contracts were being canceled, inquiring as to the number of men that would be released. In many cases persons released from war contracts were immediately employed by the same firm on peace-time work. In other cases it was found possible to transfer them to other plants. In this way the unemployment situation during the winter and early spring, while serious, was greatly decreased. Weekly reports on labor conditions were issued, based on inquiries made in all the principal cities of the country, showing the number of men in each of a group of selected plants from each industry who were employed during the current week and the prospective increase or decrease in employment. The Civil Service Commission kept the Employment Service informed regarding the previous employers of persons appointed to civil-service positions. In this way vacancies were immediately filled to the advantage of these employers, and this procedure contributed its share toward relieving the unemployment situation.

The outstanding features of the employment situation at the end of the year, i. e., June 30, 1919, were a shortage of agricultural and common labor in the West and South, an increasing demand for mechanics in the building trades, stable conditions in most of the mechanical industries, and a considerable surplus of office help and technical and professional men. This was due partly to the desire of many persons who had formerly been laborers or mechanics to secure positions as clerks or superintendents, and also to the large number of new projects requiring executive and technical abilities which are being held up pending the ratification of the treaty of peace and the determination of future financial conditions. This condition was intensified by the large number of executive and technical men being released from the Army.

The following statement shows the number of soldiers registered and referred to employment from camps and transports:

Soldiers on transports.

	Regis- tered.	Needing assist- ance.
1919:		
April.....	39,068	23,217
May.....	223,222	78,492
June.....	261,109	62,640
Total.....	523,399	164,349

Soldiers at camp and on transports.

	Dis- charged.	Inter- viewed.	Needing assist- ance.
1918: November and December.....	591, 738	124, 391	53, 122
1919:			
January.....	396, 385	276, 972	100, 720
February.....	257, 462	182, 057	70, 118
March.....	240, 394	185, 774	73, 707
April.....	352, 806	297, 487	126, 807
May.....	342, 714	^a 486, 948	145, 823
June.....	380, 395	^a 502, 356	136, 212
Total.....	2, 561, 894	2, 055, 985	706, 509

^a Some men registered on transports and again at camps.

Of the above total needing assistance, 115,096 were referred direct to employers, the remainder to bureaus.

In addition to the above, the following were registered at camps by agents of other Government departments:

Emergency Fleet Corporation.....	5, 954
U. S. Merchant Marine.....	4, 337
U. S. Railroad Administration.....	6, 069
Total.....	16, 360

The number of service men registering for employment and the number actually placed are shown in the following table:

	Regis- tered.	Placed.		Regis- tered.	Placed.
Dec. 1, 1918, to Feb. 1, 1919....	49, 481	30, 711	Week ended—		
Week ended—			Apr. 26.....	18, 062	11, 391
Feb. 8.....	21, 744	12, 659	May 2.....	20, 285	13, 195
Feb. 15.....	22, 793	12, 122	May 10.....	20, 774	12, 120
Feb. 22.....	27, 150	18, 945	May 17.....	27, 922	16, 242
Mar. 1.....	23, 206	13, 863	May 24.....	23, 897	14, 945
Mar. 8.....	20, 575	13, 118	May 31.....	20, 528	12, 803
Mar. 15.....	26, 611	15, 454	June 7.....	25, 538	19, 990
Mar. 22.....	14, 369	9, 193	June 14.....	29, 773	17, 964
Mar. 29.....	14, 952	9, 045	June 21.....	29, 906	17, 974
Apr. 5.....	17, 092	8, 861	June 28.....	27, 772	19, 022
Apr. 12.....	17, 582	9, 939	Total.....	517, 902	321, 007
Apr. 19.....	17, 890	11, 451			

Division of Information.—From July 1, 1918, to the signing of the armistice in November, this division organized and executed a national publicity campaign for the recruiting of workers for war industries. It also published the United States Employment Service Bulletin, the official organ of the service.

The campaign was directed toward inducing workers employed in nonwar work to seek war work and toward educating employers in nonwar work as to the necessity of releasing their employees for war production. This was accomplished through the spread of material to newspapers, trade and other class periodicals, general magazines, posters, motion pictures, and advertisements. The advertising

feature of the campaign was conducted like other Government war advertising drives, the "copy" being prepared with the assistance of the Division of Advertising of the Committee on Public Information and inserted in newspapers and periodicals by advertisers, the publications themselves, or through a central fund raised by the business interests of particular communities.

The regulation of unskilled labor recruiting under supervision of the United States Employment Service by the presidential order, on August 1, necessitated a vast amount of publicity to explain the provisions and operation of the order and the recruiting regulations to employers and the public generally. In this connection the United States Employment Service Bulletin proved of incalculable value.

Upon the signing of the armistice and the beginning of industrial and military demobilization the Information Division organized the national "Jobs-for-soldiers" publicity campaign. A second advertising campaign was inaugurated along the lines of that conducted during the war, the "copy" of the second campaign designed to increase buying and the resumption of business and to cause employers to keep their employment openings registered with the central agencies in their communities, at which the applications of soldiers and war workers for employment were received.

In its national "Jobs-for-soldiers" campaign the Department was able to make uniform the publicity throughout the country in connection with assisting soldiers to employment and in stimulating local campaigns. Largely through publicity communities were educated to continue regular or emergency employment offices after failure of funds for the Federal Employment Service in March made it necessary for it to abandon most of its offices in the field.

With the help of the publicity departments of the cooperating organizations the Information Division obtained the national observance of May 4, 1919, as "Employment Sunday" in the churches of all denominations of the country. In addition to a proclamation by the President, the governors of the majority of the States and the mayors of the principal cities proclaimed or indorsed "Employment Sunday" as a day to initiate more intensive efforts in finding employment for soldiers, sailors, and war workers.

Since the successful operation of any public employment system depends upon the extent to which employers use it, publicity to educate them to its use and to apprise them of the location of the various offices was a prerequisite, especially since it was impossible for the Employment Service to pay for direct advertising.

Division of Control.—The Control Division was organized on August 5, 1918. This division is concerned with the audit and payment of accounts, the preparation and issuance of orders, the compilation of statistics, preparation of general correspondence, the

supervision of the filing system, and the procurement and distribution of equipment and supplies of all kinds. The matters coming under the jurisdiction of this division are such as are necessarily incident to the conduct of an organization like this service and the administration of its fiscal and other routine affairs.

Division of Organization.—The Field Organization Division (name subsequently changed to Organization Division) was created August 5, 1918, for the purpose of establishing a systematic organization of employment offices in States and Territories. It was charged with the following duties:

(a) To perfect an efficient system of employment offices in each State.

(b) To create and perfect the organization of the State Advisory Boards and Community Labor Boards.

(c) To supervise the work of the Public Service Reserve and Boys' Working Reserve, and wherever possible to merge these with the Employment Service organization in each State.

(d) To see that proper facilities were provided for women's departments in employment offices.

(e) To see that proper facilities were provided in local employment offices for handling farm labor and such other classes of workers as may need specialized handling.

In fulfillment of these duties the Organization Division organized and developed by its corps of national field organizers 854 employment offices throughout the States and in Porto Rico. It created a State Advisory Board in each State in the country. It also created 1,600 Community Labor Boards, located throughout the various communities in the country and it provided women's departments in every State in the Union as well as facilities for the handling of farm labor. Special facilities were also created for the training of the personnel throughout the country, for a series of trade tests and interviews, and a Junior Section.

Personnel Section.—Prior to August 5, 1918, the work incident to making appointments and changes in the personnel was handled in a personnel section. After that date, the Personnel Division was organized as a separate branch of the Administrative Offices, and was enlarged so as to provide separate sections for appointments and personnel records, training of employees, welfare work, and trade interview methods. Plans were outlined for the development of these lines of activity but could not be fully worked out on account of the curtailment made necessary because of shortage of funds.

Owing to a change in the appropriation in July, 1918, new appointments had to be issued to all employees, which caused a large amount of detail work, as there were at that time in the neighborhood of two thousand employees. The number continued to increase until

the latter part of February, when a policy of retrenchment had to be adopted for the reasons above stated.

The organization reached its highest point about February 15, 1919, at which time there were 4,079 salaried employees, to which may be added 3,073 appointees at a nominal compensation of \$1 per annum. The latter class included chairmen of Community Labor Boards, industrial advisers to draft boards, managers of Bureaus for Returning Soldiers, Sailors, and Marines, farm labor agents, and others who were actively cooperating with the Employment Service.

As the organizations in the various States were perfected, new appointees had to be obtained with the utmost expedition, on account of the urgent demands made upon the service for workers of all kinds, particularly in munition and shipbuilding plants and in the harvest fields. During the months of July, August, September, and October, new appointments were issued at the rate of from 100 to 200 per week. On March 22, 1919, it was found necessary to curtail the expenses of the service and the personnel was reduced practically 80 per cent. Those whom it was not possible to retain upon a salary basis were either discontinued or given indefinite furloughs without pay. A great many of them were willing to volunteer their services and continue to work at a nominal compensation.

Junior Section.—On December 9, 1918, the Junior Section was created. This section was charged with the guidance and placement of boys and girls under 21 years of age, the designation or appointment of duly qualified counselors and the provision of suitable methods and organization for the proper counseling of such applicants.

Economic and other conditions are yearly driving increasing numbers of boys and girls into industry. Their immature minds and partly developed faculties need proper direction. A word of counsel and guidance or lack of it, at this time, may make or mar their future. Here exists a fruitful field for operation, and herein lies the need for promoting a practical and helpful organization.

The Junior Section organized and operated junior placement and vocational guidance offices in nine States in the Union. Through lack of funds these offices were greatly handicapped in their work, but the results accomplished fully demonstrated the value of junior placement work.

Boys' Working Reserve.—Since its organization under the Department, in April, 1917, the reserve has enrolled upward of 300,000 boys between 16 and 21 years of age, nearly all of whom went out from cities and towns to work in seasonal labor upon the farms.

By March, 1919, the reserve had completed its organization with a Federal State director in every State, the District of Columbia, and the Territory of Hawaii; had enrolled and placed about 300,000 boys; given intensive training in farm practices and farm machinery to

more than 50,000 city high-school boys; promoted many successful supply camps; supervised the leisure time and provided for the improvement and safeguarding of the young workers; and had returned to the schools a greater proportion of the boys than would have returned under normal conditions.

A conservative estimate of the economic value of the reserve indicates that its members added a hundred million dollars' worth of food to the world's supply at a time when food was most greatly needed. The following excerpts from reports will indicate this economic value.

A definite record was kept of about one-fourth of the Indiana reserve boys. These 6,055 boys earned a total of \$1,111,722. They worked an average of 114 days each at an average of wage of \$1.51 per day, exclusive of board. A verified record of 3,500 boys in Colorado shows earnings amounting to \$609,823. Reports from farmers in Massachusetts, based upon the cost of labor for each \$1,000 worth of farm products raised, showed that 2,500 boys added nearly \$2,000,000 to the food supply in Massachusetts last season. Reports on 600 boys give their average earning as \$166.66 per boy. In Oregon, 1,950 boys earned \$253,778. New York City boys of whom records were made, earned \$368,938.76 net. Their average production in acres was 16.4 per boy. Over 3,000 reserve boys in Texas averaged a little over 90 days' work each, and earned an average of \$1.10 per day net. A record of 860 Oklahoma boys showed 79,537 days' work, earning \$111,198.38, exclusive of board—about \$1.40 per day net. Many instances of liberty bond buying and money saving were reported. Of 145 reserve boys in a South Dakota high school, 117 have bank accounts, and saved \$10,040 last season.

Reserve high-school boys made good on the farms in over 90 per cent of the cases studied. Farmers everywhere declared these boys, when imbued by the patriotic spirit and training provided in training camps and schools, constituted the best form of emergency labor. Training was necessary if the boy was to fill the place of a farm hand released for the front and meet the reasonable expectations of the farmer.

This anticipation of the actual work done by courses in the elements of farm practices and in farm machinery becomes one of the most significant items in the reserve's program. Farm-craft lessons introduced into high schools in many States have become famous as a most significant educational development arising from the war emergency. Reports indicate that over 100,000 were in use this past winter. They are issued by the reserve in loose-leaf form and deal with farm practices generally throughout the United States. Used as a manual of instruction in the schoolroom they became a text to be taken to the laboratory, the barns, livery stables, implement stores, shops, and to the fields, in order that contact with the actual condi-

tions and equipment of farms might illustrate the elements of farm practice.

Training of boys was also furthered by the establishment, in cooperation with agricultural colleges and schools, of Central Farm Training Camps. In these camps they were taught by the faculty; brought into contact with the superior equipment of the schools; given physical exercise by which they became muscle-hardened, sun-bronzed, and "fit"; and attained a viewpoint which prepared them for new and unusual rural social and working conditions. Through the cooperation of the Young Men's Christian Association and other welfare agencies, and with the assistance of school men in nearly every State, reserve boys were everywhere safeguarded. In all training and supply camps leisure-time activities were well organized.

Women's work.—The recognition of the permanent importance of woman labor has led to striking developments in women's work during the past fiscal year. The war by July, 1918, had made woman labor a recognized industrial necessity. Because of this fact much effort has been expended to create adequate facilities to supply the demand for woman labor. Reconstruction months have continued, in the main, conditions created in the last months of the war. Registrations have not approached the level of help wanted calls. In November registrations were 50 per cent below help wanted; in January, 30 per cent; June, 29 per cent; year (10 months), 37 per cent. Weekly reports on labor surplus in industrial communities have not specified in 1919 any extensive period of unemployment among women. A study in May, 1919, showed that 22 per cent of employers' calls and 18 per cent of applications handled by the United States Employment Service are women. Twenty-one per cent of persons employed are women (Census, 1910).

Previous to July, 1918, service policies for women had been largely protective. They had led to a separate women's division, to separate placement offices, and to cooperation with organizations whose interest lay largely in protecting women workers from exploitation. Since the war has led to a keener interest in and developments for protecting women workers, the women's divisions of the United States Employment Service have been able, without neglecting this feature of women's work, to put a great deal of emphasis upon business methods, internal growth, and widening the field of opportunity for women. Offices placing women increased from about 50 to more than 400 in November. Placements jumped from 9,000 in January to 90,000 in October. Employers have been aided in trying women in new lines of work. Placement of large numbers in more settled lines has been successfully carried on. It has been proved that professional and skilled business women will gladly come to the Department of Labor for employment aid if facilities can be offered.

The registration and placement of women are shown in the following table:

Statistical report on women's work, July 1, 1918, to June 30, 1919.

Month.	Help wanted.	Registrations.	Reported placed.
1918:			
July.....	(a)	(a)	29,296
August.....	(a)	(a)	52,127
September.....	159,193	b 84,804	b 95,046
October.....	192,239	96,084	65,972
November.....	228,831	109,908	81,958
December.....	130,022	65,330	57,629
1919:			
January.....	112,802	81,235	64,020
February.....	102,238	76,631	60,623
March.....	98,593	83,146	69,500
April.....	79,300	66,382	47,011
May.....	102,046	87,460	59,090
June.....	97,799	68,727	56,741
Total:			
3 war months.....	580,263	290,796	242,976
7 reconstruction months.....	722,800	528,911	414,614
10 months.....	1,303,063	819,707	657,590
12 months.....	(a)	(a)	739,013

a Figures not compiled.

b New statistical system not in complete operation accounts for placements being greater than registrations.

Women's Land Army.—The Women's Land Army was created in the spring of 1917 to meet the serious lack of farm labor. An experimental unit was placed in Bedford, N. Y., with attention to housing supervision of the unit and recruiting of girls from colleges and seasonal trades, and the adoption of standard wages and working and living conditions. In December, 1917, the Woman's National Farm and Garden Association, the Garden Club of America, and the Women's Committee of the Council of National Defense cooperated in the naming of an advisory council and an executive committee. In 1918 chairmen were appointed in 40 States and 15,000 women were placed on farms in 20 States.

In December, 1918, an agreement between the Women's Land Army and the United States Employment Service of the Department of Labor was signed to continue the Land Army on a peace basis under Government supervision. Plans for this agreement had been nearly completed before the armistice was signed. Continuing need for farm products and the Land Army's equipment for meeting shortages in seasonal emergencies led the Employment Service to adopt the plan at the later date. Under the supervision of the United States Employment Service, recruiting was carried on in offices of the Employment Service, but training and supervision were managed by the Land Army.

FARM AND HARVEST WORK.

Farm Service Division.—The Farm Service Division was created on December 13, 1918. The Farm Service Division received reports at regular intervals from the Assistant to the Federal Director in

charge of farm work in each State as to the agricultural needs in each State and was thus in a position to direct special efforts toward meeting the demands in localities where the situation became acute. During the period of the war the Department authorized the importation of Mexican labor, under certain conditions, for agricultural pursuits, railway maintenance of way, and mining in localities where such labor had been employed in the past. Shortly after the signing of the armistice the provisions for importing Mexican labor were canceled, with the exception that laborers from Mexico might still be admitted for the purpose of working in sugar-beet production. A special agent of the Employment Service was stationed at El Paso, Tex., to cooperate with the supervising inspector in charge of the Immigration Service at that place in reaching a decision as to the necessity for the importation of Mexican labor and supplying information as to conditions under which laborers would be required to work.

When the curtailment of the service became necessary in March, 1919, the services of many of the assistants to the Federal directors in charge of farm work in the various States had to be dispensed with, and in cases where the particular employee was retained he was assigned to duties relating to the general office work of the Federal director. In view of the limited funds at the disposal of the service it was considered entirely futile to attempt to conduct a special branch throughout the entire organization relating solely to farm work. There was set aside, however, a specified amount of the available appropriation to continue the organization of an Assistant to the Director General in Kansas City, Mo., for the purpose of mobilizing workers to handle the wheat crop in the grain belt.

As the main purposes for which the Farm Service Division was created no longer existed, that division was temporarily abolished in April, 1919, and the matters theretofore handled by it were referred to the Division of Operations or to other divisions to which they properly belonged.

A summary of the operations of the Farm Service Division from July 1, 1918, to April, 1919, when it was discontinued, shows that during this 10 months' period the Employment Service was called upon for 393,933 farm laborers and that it placed in agricultural work during the same period 221,096 persons. This record of placements does not include the thousands of harvest hands directed to employment through the Kansas City field office, concerning whom it is impossible to obtain a complete statistical report.

Harvest work, Kansas City field office.—The principal work of this office was in connection with the recruiting and distribution of harvest labor in the States of Oklahoma, Kansas, Missouri, Nebraska, and South and North Dakota, although surveys and

investigations as to the labor needs of other States have been made, notably in Louisiana and Montana.

Following the completion of the 1918 harvest in Oklahoma, Kansas, and Nebraska the field officers attached to this office proceeded northward for the purpose of assisting in the distribution of harvest labor in the States of Iowa and South and North Dakota. Distributing offices were opened in South Dakota in the following cities: Sioux Falls, Aberdeen, Mitchell, Watertown, and Redfield. Most of the labor used in South Dakota comes from the Kansas and Nebraska fields, through Sioux City, Iowa, and the majority of men stop off and call at the permanent office of the Employment Service located in that city for definite direction as to where work may be had. This office, together with the permanent office at Huron, S. Dak., and those temporarily established in the cities mentioned above, report the placement of 7,708 harvest hands during a period of four weeks, commencing about July 12.

Late in the fall of 1918 this office took an active part in recruiting labor for the sugar-beet and potato fields of western Nebraska. Two officers were stationed in Omaha for this purpose, while others proceeded into different parts of Missouri and Kansas on a like mission. Several hundred men were found and shipped into the district, much to the relief of the farmers and mill owners.

Early in the spring of 1919 it became apparent that unless unforeseen conditions arose the "big wheat belt" would harvest the largest acreage ever sown to wheat in a like area. Reports received from various sources indicated that Kansas had planted 10,759,000 acres to winter wheat (nearly one-fourth of all the winter wheat sown in the United States), Oklahoma 3,295,408, Nebraska 4,500,000, Missouri 4,243,000, and the States of Texas, South Dakota, North Dakota, Minnesota, and Iowa enough winter and spring wheat to bring the total to approximately 40,000,000 acres. Past experience made it plain that an army of men would be needed to harvest this enormous acreage, that it was unlikely sufficient labor for this purpose could be found within the States mentioned. As a part of the recruiting program 49,000 posters announcing the labor needs of the "big wheat belt" were mailed to as many post offices. That much interest was aroused is evidenced by the fact that during a period of six or seven weeks about 15,000 letters were received. Not only did the requests for further information come by regular mail, but by telegraph, long-distance telephone, and special-delivery service. These communications, representing some 30,000 to 40,000 individuals, were received from all parts of the United States and from persons in all walks of life. Engineers, cooks, men with teams, and other special classes were furnished. About two weeks before harvest time additional posters, announcing the location of all United States Employment Service offices in the wheat belt were put

up in as many different post offices in territory from which most of the labor was expected to come, the purpose being to draw as many men as possible into the various offices from where they could be rapidly distributed with the least loss of time among communities most urgently in need of their services and at a minimum expense for railway transportation.

Shortly before cutting time questionnaires were mailed requesting data as to number of harvest hands that would be needed, the probable cutting date, wages, and certain other needed information. From replies received it was found that many counties would be able to get along with local labor, which permitted the elimination of such counties from its calculations and the concentration of efforts on other districts. Reports indicated that Oklahoma would need from 10,000 to 12,000 men; Kansas, about 60,000; and Nebraska, about 6,000—this number being in addition to labor that might be found locally.

The total number of harvest hands needed throughout the wheat belt depends upon weather conditions. During a normal season harvest should start in north central Oklahoma about June 5 to 8, reaching the southern Kansas counties about June 15 to 18; the central Kansas counties about 10 days later, and the north central and northwestern territory about July 1 to 5. Under these conditions it becomes possible to utilize the services of many men who start in Oklahoma in the southern or central Kansas counties, and those who commence in southern Kansas finish in time to assist in the harvest in the north central and northwestern districts. However, as it frequently happens and did this year, the Oklahoma harvest was delayed by cold and wet weather until about June 15. Immediately following this date a period of hot weather set in which hastened the ripening of the grain throughout Kansas and caused nearly all districts to call for labor, and to aggravate the gravity of the situation the southeastern and southern Nebraska fields commenced operations, making it necessary to supply three States with men at the same time.

From the following table it will be noted that the various offices have reported an (estimated) attendance of 93,338 and the actual placement of 46,242:

State.	Estimated attendance.	Placed.
Oklahoma.....	29,872	10,593
Kansas.....	25,745	12,085
Missouri.....	21,208	10,705
Nebraska.....	5,241	5,110
South Dakota.....	7,442	6,200
Iowa.....	3,830	1,549
Total.....	93,338	46,242

Wages in the harvest fields have been higher this year than ever before. Sixty cents per hour and transportation from Kansas City and other distributing points, or 70 cents without railway fare, became the standard. In Nebraska the prevailing scale has been 50 and 60 cents per hour with board.

The very high cost of railway transportation has proved the greatest obstacle in attracting a plentiful supply of harvest labor, and it became evident very early in the season that the wages as set at 50 cents per hour would not bring in the labor as rapidly as needed; and it was only after it became generally known that the wage had been advanced to 60 and 70 cents per hour that men reported in satisfactory numbers.

When it is realized that the fare to the fields from even such a near-by point as St. Louis amounts to approximately \$18, with a like sum involved for the return fare, it becomes a difficult matter to persuade men that there is much to be gained in harvest work. Many interested individuals and organizations, as well as this service and other governmental agencies, have made repeated appeals to the Railway Administration for a reduced railway rate to harvest hands, but so far without success. It is the opinion of the Kansas City field office that with normal labor conditions prevalent in the country during another harvest season, it will require either an abnormally high wage scale or a material reduction in railway rates to bring in sufficient labor to harvest the crops.

EMPLOYMENT STATISTICS.

The following tables summarize the employment activities so far as it is possible to reduce them to figures. Table 1 deals with the activities of the service during the fiscal year ended June 30, 1919; while Table 2 covers the entire period during which the Employment Service has operated as a separate branch of the Department, that is, from January, 1918, to June, 1919, inclusive.

TABLE 1.—Activities of the United States Employment Service during the fiscal year ended June 30, 1919, by months.

Month.	Registra- tions.	Help wanted.	Referred.	Reported placed.
1918:				
July.....	282, 294	484, 033	250, 152	217, 291
August.....	555, 505	1, 227, 705	500, 510	395, 530
September.....	531, 226	1, 476, 282	513, 662	362, 696
October.....	594, 737	1, 588, 975	606, 672	455, 931
November.....	744, 712	1, 724, 943	748, 934	558, 469
December.....	549, 593	1, 024, 330	525, 486	392, 934
1919:				
January.....	587, 200	730, 881	514, 436	372, 186
February.....	496, 299	437, 475	406, 824	299, 118
March.....	523, 736	539, 393	440, 833	327, 660
April.....	364, 061	387, 256	309, 158	232, 135
May.....	487, 929	510, 689	424, 738	333, 587
June.....	449, 155	519, 485	404, 948	319, 813
Total.....	6, 166, 447	10, 701, 447	5, 646, 353	4, 267, 350

TABLE 2.—*Activities of the United States Employment Service, from January, 1918, to June, 1919, inclusive, by months.*

Month.	Registra- tions.	Help wanted.	Referred.	Reported placed.
1918:				
January.....	82,353	89,002	62,642	51,183
February.....	92,452	92,594	70,369	58,844
March.....	144,156	177,831	118,079	100,446
April.....	195,578	320,328	171,306	149,415
May.....	206,181	323,587	179,821	156,284
June.....	246,664	394,395	221,946	192,798
July.....	282,294	484,033	250,152	217,291
August.....	555,505	1,227,705	500,510	395,530
September.....	531,226	1,476,282	513,662	362,696
October.....	594,737	1,588,975	606,672	455,931
November.....	744,712	1,724,943	748,934	558,469
December.....	549,593	1,024,330	525,486	392,934
1919:				
January.....	587,200	730,881	514,436	372,186
February.....	496,299	487,475	406,824	299,118
March.....	523,736	539,393	440,833	327,660
April.....	364,061	387,256	309,158	232,135
May.....	487,929	510,689	424,738	333,587
June.....	449,155	519,485	404,948	319,813
18 months.....	7,133,831	12,104,184	6,470,516	4,976,320

From Table 2 it will be noted that approximately 10,000 persons were placed in jobs of all kinds each working day for the 18 months' period, and this without costing them or their employers a cent and at a cost to the whole country of but \$1.34 per placement. The saving in fees to the men and women directed to employment by the Federal Government in cooperation with States and municipalities is estimated at not less than \$10,000,000, while the saving to the country in hours of labor gained by minimizing the time lost by these workers between jobs and in reducing labor turnover is estimated at many more millions.

Placements were made of every kind of worker, from common laborers and domestics to high-salaried professional and technical workers. It was not uncommon for a \$1,800 examiner to place a \$15,000 engineer or executive. The recruiting and placing of farm labor has been one of the special features of the work of the Federal Employment Service during the last year and a half.

Women constituted 20 per cent of the total workers placed and many a woman has found in the Federal Employment Service a gateway to the industrial, commercial, or professional life she has desired to enter. Large numbers of college-trained women have used the service, which has been working in conjunction with alumnus associations throughout the country.

The common-labor placements were but 23 per cent of the total of slightly under 5,000,000 persons placed. The other 77 per cent consisted of skilled labor and other workers engaged in specified occupations.

In arriving at its figure of \$1.34 as the average cost per placement the United States Employment Service has included all the cost of

building up and equipping the service. In private corporate financing, these items would be considered as permanent investments and would not be chargeable to operation.

DEPARTMENTAL RECOMMENDATIONS.

IMPROVEMENT OF THE WORKING CONDITIONS OF WAGE EARNERS.

In the performance of all its duties the Department has always been mindful of the fact that the self-respect and prosperity of a Nation are but the aggregate of the self-respect and prosperity of its citizens. And as the great mass of the population of the United States is engaged in wage-earning employment, any advancement in the condition of the workers must necessarily contribute in equal proportion toward the welfare of the country as a whole. Indeed, the Department believes that in order to fulfill the obligations laid upon it by its organic act it must devote its utmost efforts toward improving the conditions surrounding the worker in industry. By that act the function of the Department "shall be to foster, promote, and develop the welfare of the wage earners of the United States, to improve their working conditions, and to advance their opportunities for profitable employment."

During the war the Department was authorized to set up machinery for investigating working conditions, and where advisable to recommend standards for their improvement. In another portion of this report the accomplishments of the Working Conditions Service so established are given in some detail and need not be repeated here. It is sufficient to say that although this organization was primarily treated for the purpose of stimulating war production the results of its activities have been such as to assure the value of its services in times of peace. It is therefore strongly urged that early legislation be enacted with a view to reviving and continuing the activities of the Working Conditions Service.

TEMPORARY ADMINISTRATIVE ASSIGNMENTS.

In the annual reports of the four preceding years attention has been called to the embarrassing situations which have arisen through the increase of departmental work. It is highly desirable that greater elasticity should be obtained through temporary administrative assignments. It is therefore again recommended that section 179 of the Revised Statutes be so amended as to empower the President to afford relief through Executive order by adding the following clause:

The officer so authorized and directed in anticipation of vacancy, sickness, or absence shall have authority meanwhile to perform such duties as the head of the Department to which the President assigns him shall prescribe.

SUPERANNUATION AND RETIREMENT.

Previous reports have also pointed out the embarrassing situation in which the Department frequently finds itself with respect to such of its employees as have been in Government service for many years. This Department, like many others, frequently finds itself in the dilemma either of maintaining on its rolls persons who have outlived their usefulness and thus impairing departmental efficiency or of discharging many who by reason of long and faithful service deserve more considerate treatment. Such a situation can best be obviated by the establishment of an equitable system of retirement under such terms as shall subserve the interests of efficiency and economy, and at the same time insure fair financial provision for the old age of faithful employees.

TRAINING OF WORKERS.

The duty of encouraging the wageworker to prepare himself for more profitable employment is clearly within the scope of this Department. Again referring to the organic act creating the Department of Labor, we find the clause charging it with advancing the opportunities of the wage earner for profitable employment. It has been proved, not only in this country but in others as well, that the most effective method of increasing and improving the workers' capacity for production is through training opportunities within the industries themselves.

As part of his war duties the Secretary of Labor was charged, in January, 1918, by the President with the creation of an agency that would furnish "a satisfactory method and administration for training of workers." In accordance with that mandate the Training and Dilution Service, later known as the United States Training Service, was organized within the Department. Although directed principally toward those industries affected by the war, its activities have, as a matter of fact, been far more reaching in their effect. Under their stimulus many industries, realizing the value of training in time of peace as well as during war, have endeavored to continue their efforts toward training workers, although the guidance and encouragement of the Government have been withdrawn.

It is believed that increased skill on the part of the workers, and its consequent stimulus toward greater production, is even more important in peace than in war. And it is felt that the work formerly conducted by the United States Training Service, with the ideal of establishing a means whereby wage earners may continuously advance in industrial growth and development, is so urgently needed

by industry throughout the country as to warrant continuation of its activities. I recommend, therefore, the enactment of legislation to accomplish that end.

INCREASE IN PER DIEM IN LIEU OF SUBSISTENCE.

I also desire again to call attention to certain hardships laid upon many persons engaged in travel for the Department. Under the terms of the appropriations granted to the Department, the total amount which can be allowed outright for subsistence is \$4 per diem. This limit was fixed upon originally August 1, 1914.¹ At that time the limitation was quite reasonable and no doubt necessary in order to limit unnecessary extravagance and waste of public funds. Since then, however, there has been a marked increase in the cost of living, and in particular of the two principal items (food and lodging) embraced within the meaning of the term subsistence. The figures of the Bureau of Labor Statistics, which are most conservative, indicate that the cost of foodstuffs during the period since the adoption of the limitation has greatly advanced. Thus the purchasing power represented by \$4 to-day is equivalent to only \$2.27 at the time of the adoption of the rule. In consequence faithful employees of the Department find themselves forced to draw upon their own means to make up the deficit between their actual expenditure and the permitted sum. The greater number of these persons are those who are serving the Government at modest salaries, which have not kept pace with the cost of living. They can least afford further drains upon their means. I therefore feel that an increase in the amount allotted for subsistence is imperative and recommend that it be advanced from \$4 to \$6 per diem.

MEASURES FOR RELIEF OF UNEMPLOYMENT.

Not the least of the factors which made for national efficiency during the war was the proper distribution of labor. Prior to the war it was our custom to disregard the fact that while large numbers of men were seeking employment in some parts of the country, production was seriously hindered for lack of man power in others. During the war efficiency was brought about by bringing together these two vital and complementary factors in production through the United States Employment Service. Unfortunately since the war the department has been forced to so drastically curtail the activities of that service as to render it ineffective of its purpose. If the department is to fulfill the purposes for which it was created not only must legislation be passed permanently establishing the Employment Service, but it must receive liberal appropriations as well.

¹ Act August 1, 1914, ch. 223, sec. 13, Stat. 680.

If we are to deal adequately with the problem of unemployment, however, we must not stop with the mere distribution of labor. Distribution itself would be sufficient if the number of opportunities for work and the number of men seeking employment were approximately equal. This, however, is not the case. Normally, there are many more men seeking work than we can properly provide for in our various industrial and agricultural undertakings. The ultimate remedy lies in the creation of new opportunities for employment. Such new opportunities may only be created by a more adequate use of our land and natural resources. To that end I urge that legislation substantially in accord with the views presented elsewhere in this report (pp. 195-199) be enacted.

The whole world is face to face with the most difficult peace-time problem it has ever had to deal with. The wastage of war has been tremendous. There has been not only the loss of millions of lives and the permanent disability of other millions of people but also an extraordinary destruction of the material resources of the world. The power of replacement of the things destroyed has been seriously impeded by the conditions that constitute the aftermath of war. Industry has been disarranged by the processes of readjustment to the needs of peace, and commerce has been handicapped by insufficient shipping facilities, rates of foreign exchange, and domestic uncertainty. Many countries are without stable government, and financial inflation in all the commercial countries of the world has played havoc with the relative values of money, wages, and commodities.

The effect of these things has been reflected in the high cost of living and the consequent demand for higher wage rates to meet the increasing burden of the family budget. Yet increases in the wage rate do not always give relief. There are but two ways by which the general standard of living of the wage earner can be improved. One is by increased productivity, making more material available for wages. The other is by taking the means of increased compensation out of the profits of the employer. If wages are increased and profits remain the same, the burden is passed on to the consuming public in the form of an increased cost of living and comes back to the wage worker himself. No portion of improved living standards can come out of the profits of the employers unless there is profiteering.

And what gives the opportunity for profiteering? The very conditions that we are confronted with to-day--the destructive agencies of war, the disarrangement of industry and commerce, and the unrest and high nervous tension of our people, resulting in a shortage of supply as compared with demand. The whole world is interested in returning to the highest productive efficiency, having due regard to the health, safety, and opportunities for rest, recreation, and improvement of those who toil. The more productive we are the

sooner we shall replace the wastage of war, return to normal price levels, and abolish opportunities for profiteering. There can be no profiteering where the production is ample to meet the needs of the people of the world if there is a free flow of material from producer to consumer. It is only where the production is not sufficient for the needs of the people, or, when sufficient, where artificial obstructions impede proper distribution, that there is any possibility of profiteering. Anything that restricts the highest efficiency commensurate with the physical, mental, and spiritual well-being of the workers tends to retard the progress of the country as a whole.

For that reason we are all interested in the maintenance of industrial peace. But as this Department declared in its first annual report, there can be no permanent industrial peace that is not based upon industrial justice. Just as international wrongs may accumulate to the point where war is necessary to bring relief, so industrial wrongs may provoke industrial conflict as an alternative to further endurance of the wrongs imposed. Nor is it permissible that either side to an industrial controversy be the sole judge of what constitutes justice. The means must exist by which all men may know that justice has been secured. An imaginary wrong has all the force and effect of reality until it is shown that it is only imaginary. We have found ways of regulating all the other relations of mankind. Surely human intelligence can devise some acceptable method of adjusting the relationship between employer and employee fairly.

It has always been the opinion of this Department that in mutual counsel lies the stability of industrial relations. Just as the peace of nations is promoted by frank and friendly intercourse, so may the peace of industry be maintained by the same methods.

But this intercourse can not come about unless there is first recognized the right of collective bargaining. In the past this right has been conceded by some employers but vigorously combated by others. Whatever may have been the reasons which actuated employers in the past in the denial of that right, it is certain that more and more have conceded it each year. The public interest demands that it be universally recognized, for the primary interest of the public is in peace, and the denial of organization is a denial of the only means of peaceable settlement that wage earners have. At a time when labor organizations of a revolutionary or lawless type are especially in the public eye, it is particularly important to point out that the responsibility for the development of such organizations must in the long run fall upon the employer who denounces the organization of lawful trade-unions.

In an imperfectly developed state of society or in minor instances this failure to recognize the rights of others injures only the persons immediately concerned. But with the increase in the size of productive enterprises and the corresponding increase in the numbers of

employees, many industrial disputes take on such a character as to concern not only the special interests immediately involved but also to menace many whom for want of a better name we may call the innocent bystanders. Modern strikes and lockouts tend more and more to affect not only the employer and worker but all who come within range of the economic controversy. At no time has this been more important than at present.

The right of any man to cease working for another for any reason that is sufficient to himself is the basic element of human liberty. The right of any person to refuse to operate his plant at any time he desires to do so is the exercise of a property right guaranteed by the Constitution. It does not follow that because these rights exist it is necessary to exercise them. They must nevertheless be safeguarded. Having done that and having devised the machinery by which justice can be secured and by which everybody at interest has the opportunity of knowing that justice has been secured, it is not likely that the right to cease work will be exercised by sufficient numbers, or the right to cease operating industrial plants will be carried to such an extent, as seriously to affect the welfare of the rest of the people. It is with such thoughts as these in view that I urge upon my fellow-countrymen the exercise of the utmost tolerance and the maximum of good will and mutual forbearance during the trying days that are upon us.

W. B. WILSON, *Secretary.*

INDEX.

A.

	Page.
Abortion, infectious animal.....	1301
Adjutant General's Department, Army.....	331
Admiralty litigation.....	689
Aerial mail service.....	788
Aerological investigations.....	1570
Aeronautical instruments.....	1665
Aeronautics and meteorology.....	1561
Aeronautics, joint Army and Navy board on.....	926
Aeroplane engines.....	958
Age determined by Census records.....	1677
Agricultural instruction in schools.....	1474
Agriculture:	
Acreages and yields, 1919.....	1226
Cooperative associations.....	1252
Exports.....	1227
Extension work in South, office of (<i>see also</i> Extension Work).....	1483
Farm land problems.....	1239
Farm management and farm economics.....	1245
Foreign yields also increased.....	1237
Forestry, extension of.....	1244
Land settlement.....	1241
Marketing and distribution.....	1251
Progress of.....	1231
Roads.....	1253
Seed-grain loans.....	113
Tenancy.....	1242
Values.....	1231
Agriculture, Department of:	
Animal Husbandry Division.....	1266
Animal Industry, report of chief of bureau of (<i>see also</i> Animal Industry).....	1262
Bibliological Survey, report of chief of bureau of (<i>see also</i> Bibliological Survey).....	1436
Chemist, report of (<i>see also</i> Chemist).....	1380
Crop and Live-Stock Reporting Service.....	1248
Crop estimates, report of chief of bureau of (<i>see also</i> Crop estimates).....	1460
Entomologist, report of (<i>see also</i> Entomology).....	1413
Farm management, office of (<i>see also</i> Farm management).....	1555
Food and drugs act, enforcement of.....	1381
Forester, report of (<i>see also</i> Forest Service).....	1354
Home economics, office of.....	1503
Markets, report of chief of bureau of (<i>see also</i> Markets).....	1523
Plant Industry, report of chief of the bureau of (<i>see also</i> Plant Industry).....	1316
Public Roads, report of chief of bureau of (<i>see also</i> Public Roads).....	1506
Secretary of, report of.....	1225
Seed distribution, Congressional.....	1342
Soils, report of chief of bureau of (<i>see also</i> Soils).....	1402
States relation service, report of director of (<i>see also</i> Relation Service).....	1470
Weather Bureau, report of chief of (<i>see also</i> Weather Bureau).....	1559
Agronomic horticultural investigations.....	1316
Air mail postage, reduction in rates of.....	788
Air mail service.....	784, 787
Air Service (<i>see also</i> Aviation), Army.....	324
Aircraft factory, Naval.....	927

	Page.
Alaska.....	1065, 1182
Agricultural Experiment Station.....	1478
Coal.....	1067
Coal fields, Navy plans for developing.....	992
Engineering Commission.....	1083
Fisheries Service.....	1692
Fur seal service.....	1693
Seal herd.....	1695
Alien arrivals and departures.....	1873
Alien enemies.....	695
Allied commander in chief.....	367
Allies, relations with the.....	421
Allotments and family allowances, military and naval.....	127
American divisions from March to September, 1918, employment of.....	369
American Expeditionary Forces.....	278
Administration—	
Medical and sanitary conditions.....	411
Records, personnel, and mail service.....	412
Allies, relations with the.....	421
American divisions from March to September, 1918, employment of.....	369
American front and line of communications.....	349
Armistice terms, execution of.....	419
Assembling the first.....	374
Commander in chief, allied.....	367
Educational Work.....	424
Engineer corps, construction of.....	405
Food Commission.....	422
General Staff.....	351
German offensives of 1918 and related allied agreements.....	362
Germany, advance into.....	278, 392
Inspection—discipline.....	413
Intelligence.....	355
Italy.....	391
Liquidation Commission, United States.....	420
Mail Service.....	784
Medical and sanitary conditions.....	411
Meuse-Argonne operation.....	340
Military justice.....	413
Military situation.....	346
Motor Transport Corps.....	403
Munitions, aviation.....	410
Munitions—	
Chemical warfare service.....	410
Ordnance.....	409
Tanks.....	410
Occupied territory, civil administration of.....	418
Ocean tonnage.....	401
Organization, period of.....	345
Organization projects.....	348
Personnel, reclassification of.....	405
Personnel, replacements of.....	403
Prisoners of war.....	416
Provost Marshal General's Department.....	414
Purchasing Agency.....	400
Quartermaster Corps.....	407
Religious work.....	423
Remounts.....	404
Renting, requisition and claims service.....	408
Russia, American troops in.....	279, 392
St. Mihiel operation.....	375
Second Army, operations of.....	390
Services of supply.....	397
Siberia.....	280
Signal Corps.....	408
Stars and Stripes, publication of.....	425
Summer of 1917 to spring of 1918.....	357
Training.....	353

American Expeditionary Forces—Continued.	Page.
Transportation Corps.....	406
Troops, expediting shipment of.....	360
Troops returned to United States.....	394
Welfare work.....	422
Americanization work.....	1909
Animal husbandry.....	1266
Animal Industry:	
Abortion, infectious.....	1301
Biochemic Division.....	1306
Biological Products, examination of.....	1304
Blackleg vaccine.....	1304
By-products, importation of animal.....	1291
Dairy-cattle breeding.....	1283
Dairy Division.....	1273
Dairy engineering.....	1283
Dairy-manufacturing investigations.....	1278
Dairy research laboratories.....	1281
Dairy statistics.....	1283
Dips and disinfectants.....	1309
Disease control, progress in.....	1263
Dourine, eradication of.....	1293
Export, inspection of animals for.....	1292
Field inspection division.....	1293
Glanders.....	1304
Hog-cholera, control division.....	1300
Hog-cholera investigations.....	1306
Imported animals, inspection and quarantine of.....	1290
Indian agencies, inspection of animals for.....	1294
Influenza, anthrax, and other diseases, control of.....	1294
Laboratories, branch.....	1306
Literature.....	1266
Live-stock export regulations revised.....	1263
Live stock, improvement in quality of.....	1265
Live-stock sanitary work in interstate commerce.....	1295
Live-stock transportation and quarantine laws, violations of.....	1295
Meat and products, labeling of.....	1288
Meat inspection.....	1265
Meat-inspection Division.....	1284
Meat-inspection laboratories.....	1289
Milk investigations and demonstrations.....	1279
Miscellaneous Divisions.....	1315
Parasites, miscellaneous investigations on animals.....	1314
Parasites, treatment and control of external.....	1313
Parasites, treatment for internal.....	1313
Pathological Division.....	1301
Plant poisoning of stock.....	1305
Poultry diseases.....	1305
Poultry investigation.....	1271
Quarantine Division.....	1290
Rabies.....	1304
Regulatory work, construction side of.....	1265
Report of chief of Bureau.....	1262
Roundworms of hogs.....	1312
Scabies, eradication of.....	1293
Tick Eradication Division.....	1296
Tuberculosis Eradication Division.....	1298
Veterinary education.....	1315
Virus-serum control, office of.....	1316
Wild animals, autopsies of.....	1305
Zoological Division.....	1312
Animal quarantine act.....	746
Anthrax, control of.....	1294
Antisubmarine operations.....	929
Antitrust division, Department of Justice.....	723
Appropriations, involving funds and reimbursements of.....	100
Aquarium, laboratory.....	1587

	Page.
Aquatic products, increased utilization of.....	1691
Archives building.....	1589
Argonne-Meuse offensive.....	1005
Arkansas, sunk land cases in.....	756
Armistice:	
Army readjustment since.....	617
Navy work abroad since the.....	939
New duties imposed by.....	941
Armistice terms, execution of.....	419
Armor plant, Navy.....	957
Army. (<i>See also</i> American Expeditionary Forces.)	
Army:	
Adjutant General's Department.....	331
Administration.....	411
Air Service, independent.....	324
American Forces in Germany.....	278
Armistice, readjustment since.....	617
Automobiles.....	408
Civilian personnel.....	343
Claims in United States settlement of.....	304
Demobilization.....	269, 276, 638
Education and special training, committee on.....	510
Education in, since the armistice.....	286
Eightieth division, program of July 18, 1918.....	430
Embarkation Service, the.....	567
Equipment branch.....	460
Finance Department.....	600
Financial operations.....	343
Funds for payment, for in Europe.....	97
General Staff Control, necessity for.....	442
Inspection General's Department.....	332
Insular Affairs.....	339
Liquidation abroad.....	305
Mail.....	780
Medical Department.....	332
Military Education, system of.....	512
Military Intelligence, division of.....	514
Military intelligence, neglect of.....	514
Military Intelligence, organization of.....	514
Military justice.....	291
Military policy, permanent.....	309
Militia Bureau.....	339
Miscellaneous Branches.....	633
Mobilization of entire Nation.....	427
Mobilization of the forces.....	446
Morale Branch.....	287, 635
Motor Transport Branch.....	478
Officers and enlisted men, schools for.....	286
Officers, higher education of.....	283
Operations branch.....	446
Operations division.....	445
Operations, miscellaneous work of.....	481
Peace Organization.....	443
Pershing, report of Gen. John J. (<i>See also</i> American Expeditionary Forces).	345
Personnel Branch.....	470
Personnel, demobilization of.....	269
Program, original tentative.....	428
Publications of Military Intelligence Division.....	516
Purchase and Storage, Office of Director of.....	608
Purchase, Storage, and Traffic Division.....	528
Reserve Officers' Training Corps, 1919, activities of.....	277
Results accomplished.....	443
Russia, northern, American Expeditionary Forces.....	279
Sales abroad.....	302
Secretary of War, report of.....	259
Selective service cases.....	691
Selective Service Record Division.....	331

Army—Continued.	Page.
Service schools.....	285
Siberia, American Expeditionary Forces.....	280
Statistics branch.....	633
Storage branch.....	587
Students' Training Corps, 1919, activities of.....	277
Thirty-division program of October 7, 1917.....	429
Traffic Service, inland.....	578
Training of.....	484
Transports.....	909
Troops brought home.....	907
Troops, necessity for use of since June 30, 1918.....	282
War contracts, settlement of.....	293
War Plans Division.....	482
Welfare work in United States.....	289
Ash-pan act.....	745
Asiatic immigration.....	1896
Atlantic and Pacific Fleet organization.....	895
Atlantic, first to fly across.....	915
Attachés in Europe, activities of.....	1622
Attorney General, report of. (<i>See also</i> Justice, Department of).....	671
Automobile accessories case.....	726
Automobiles, Army.....	408
Aviation:	
Air mail's contributions to.....	787
Air Service, Army.....	324
Airship of largest type purchased by the Navy.....	921
Battleships supplied with planes.....	925
"Blimps" make new world records.....	923
British aviators make first nonstop flight across ocean.....	921
"C-5" in flight from Montauk to St. Johns.....	923
"F-5" flying boat.....	923
Hangar at Lakehurst, N. J.....	922
Integral part of the naval service.....	924
Munitions.....	410
Navy.....	915
Navy casualties during war.....	931
Navy demobilization in United States.....	932
Navy European service.....	998
Navy objections to creating separate.....	925
Navy operations with troops.....	927
Navy ground schools closed.....	933
Navy stations demobilized in Europe.....	931

B.

Bankruptcy law.....	673
Barley.....	1329, 1331
Battleship service in Europe.....	901
Beans, soy.....	1330
Beans, velvet.....	1329
Beatty, Admiral.....	903
Beavers and woodchucks.....	1442
Bee culture.....	1433
Benson, Admiral.....	939
Beverages.....	1391
Biological investigations of fishes.....	1688
Biological products, examination of.....	1304
Biological Survey:	
Beavers and woodchucks.....	1442
Bird counts.....	1450
Birds and mammals, importation of.....	1458
Birds, distribution and migration of.....	1450
Blackbirds in Ohio.....	1447
Breeding grounds of migratory wild fowl.....	1450
Eagles, destructiveness of.....	1449
Economic investigations.....	1436
Fish-eating animals.....	1446
Food habits of other birds.....	1449

	Page.
Biological Survey—Continued.	
Fur-bearing animals.....	1445
Game laws.....	1457, 1460
Gophers, pocket.....	1442
Ground squirrels.....	1441
Investigations.....	1449
Jack rabbits and cottontails.....	1441
Mammal and bird reservations.....	1451
Mice, wood rats, and cotton rats.....	1443
Migratory-bird treaty and Lacey Acts.....	1455
Moles.....	1444
Ornithology, economic.....	1445
Prairie dogs.....	1440
Predatory animals and rabies.....	1437
Quail from Mexico, importation of.....	1459
Rabbits, domestic.....	1444
Rats and mice.....	1443
Report of chief of bureau.....	1436
Rice damaged by wild fowl.....	1448
Rodent control.....	1439
White-winged doves in Arizona.....	1447
Wild life in national parks.....	1451
Binder twine, hard fibers for.....	1332
Biochemic Division.....	1306
Bird act.....	747
Bird counts.....	1450
Birds and mammals, importation of.....	1458
Birds, distribution and migration of.....	1450
Blackbirds in Ohio.....	1447
Blackleg vaccine.....	1304
Boiler pressure, steamboat inspection of.....	1725
Bond and note designs.....	84
Bonds for Government officers, surety.....	153
Bonds offered as security for postal-savings deposits.....	886
Bonds, soldiers' and sailors' civil relief.....	134
Boys' agricultural clubs.....	1491
Boys' and girls' agricultural club work.....	1500
British aviators make first nonstop flight across ocean.....	921
Broom corn.....	1318
Budget system, a.....	99
Buildings. (See Public buildings.)	
Bulb-culture investigations.....	1326
C.	
Cable situation, Pacific.....	1591
Camphor industry.....	1338
Cantaloupe exchange cases.....	725
Capital issues committee.....	91
Car-lot shipments.....	1535
Cargo vessels converted into transports.....	910
Censorship, mail.....	784
Census:	
Age determined by census records.....	1677
American statistical and economic associations, joint advisory committee of.....	1681
Bureau of.....	1671
Cooperation with other services.....	1589
Cotton and cotton seed.....	1675
Electrical industries.....	1672
Equipment, mechanical.....	1684
Fats and oils, statistics of.....	1676
Field force.....	1682
Financial statistics of cities.....	1674
Financial statistics of States.....	1675
Fourteenth Census law.....	1680
Greenhouses, census of commercial.....	1679
Homes and farms, encumbrances on.....	1684
Housing for, Bureau of.....	1588

Census—Continued.	Page.
Influenza epidemic, special investigation of	1677
International Statistical Yearbook	1677
Leaf tobacco, stocks of	1675
Liberty loan work	1679
Life tables, United States	1676
Marriage and divorce	1676
Office force	1683
Official register	1676
Peace conference, statistics relative to foreign countries for	1679
Population, special censuses of	1676
Possessions, outlying	1684
Provost Marshal General, work done for	1679
Religious bodies	1673
Schedules, etc., preparation of	1683
Shipbuilding	1672
Shipping Board, information for United States	1679
State institutions, statistical directory of	1677
Statistics of cities, general	1674
Transportation by water	1672
Vital statistics	1673
Work done for other governmental agencies	1677
War work of bureau of	1678, 1680
Cereal and forage crop insect investigations	1413
Cereal pathology	1346
Cereals and flour, analysis of	1394
Chemical Warfare Service	410
Chemist, report of Department of Agriculture	1380
Chemistry	1661
Chief of Staff, report of (<i>see also</i> Army)	427
Child-labor tax law	202
Children's Bureau, report of	1899
Cities, statistics of	1674
Citrus by-products	1392
Citrus-canker eradication	1354
Citrus trees, spray mixtures for	1352
Civil-service employees, retirement of	109
Civilian personnel, Army	343
Claims. (<i>See</i> Court of Claims.)	
Claims in United States, settlement of Army	304
Climatology	1572
Clothing, surplus Navy	990
Clover seed, infestation of	1352
Coal and oil required by Navy	992
Coal as a national asset	1039
Coal saving by saving electricity	1047
Coal, saving of	1044
Coal strike	1037
Coast and Geodetic Survey	1708
Coast and Geodetic Survey:	
Field work	1710
Publications	1708
War work	1720
Coast and Lighthouse Service	1032
Coast Guard:	
Anchorage control	143
Executive order	143
Life-saving medals, award of	246
Services with the Navy	1032
Codes, cipher and signal books, Navy	987
Colgate case	727
Color investigations	1399
Commerce. (<i>See</i> Foreign and Domestic Commerce and Interstate Commerce.)	
Commerce cases	733
Commerce, Department of:	
Appropriations and expenditures	1592
Archives building	1589

Commerce, Department of—Continued.

	Page.
Buildings	1583
Census, Bureau of (<i>see also</i> Census)	1588, 1671
Coast and Geodetic Survey (<i>see also</i> Coast and Geodetic Survey)	1708
Estimates for fiscal year 1921	1595
Fisheries, Bureau of (<i>see also</i> Fisheries)	1685
Fisheries conference, American-Canadian	1578
Foreign and Domestic Commerce, Bureau of (<i>see</i> Foreign and Domestic Commerce)	1619
Industrial Board	1612
Industrial Cooperation Service	1613
Lighthouses, Bureau of (<i>see also</i> Lighthouses)	1582, 1698
Motion pictures in industry	1591
Navigation, Bureau of (<i>see also</i> Navigation)	1726
Needs	1589
Pacific cable situation	1591
Personnel	1597
Printing and binding	1611
Salaries	1598
Secretary of, report of	1577
Solicitor's office, work of	1611
Standards, Bureau of (<i>see also</i> Standards)	1585
Steamboat inspection service (<i>see also</i> Steamboat-Inspection Service)	1721
Superannuation and retirement	1597
Transportation of families, etc.	1670
Vessels in marine service	1579
Waste-reclamation service	1615
Waterways, development of	1612
Commerce, report of Secretary of	1577
Commercial information, demands for	1637
Compensation Board, Navy	1027
Comptroller of the Currency, report of	188
Conciliation, Division of Labor	1757
Congressional cases	738
Congressional seed distribution	1342
Container	1399
Contracts, settlement of war contracts	293
Conversion of Liberty Bonds	64
Coos Bay Wagon Road grant	752
Corn culture	1327
Corn Products case	726
Cost accounting, postal service	854
Cotton	1340
Cotton and cotton seed, census of	1675
Cotton, California Egyptian	1330
Cotton-gin explosions, investigation of	1395
Cotton handling and marketing	1539
Cotton, standards	1541
Cotton testing	1541
Cotton warehouse investigation	1540
Council of National Defense	1027
County agents, agricultural	1484
Court of Claims	737
Appeals from	738
Courts. (<i>See also</i> Justice, Department of.)	
Courts martial, Navy	1016
Credit expansion	27
Criminal Identification, Bureau of	769
Crop and Live-stock Reporting Service	1248
Crop diseases	1350
Crop economics	1557
Crop estimates:	
Accuracy of	1465
Cooperation with State Departments of Agriculture	1463
Report of chief of	1460
State assessors' returns	1464
War organization	1460
Crop plants abroad, seeking new	1335
Crop plants and crop extension	1330

	Page.
Crop utilization.....	1337
Currency and credit expansion.....	27
Currency designs.....	85
Custom (<i>see also</i> Customs Service).....	135
Customs cases.....	763
Customs cases, reappraisalment in.....	675
Customs Service.....	135
Report of.....	218
Tea inspection.....	223

D.

Dairy-cattle breeding.....	1283
Dairy Division.....	1273
Dairy engineering.....	1283
Dairy-manufacturing investigations.....	1278
Dairy products.....	1396, 1536
Dairy research laboratories.....	1281
Dairy statistics.....	1283
Date culture, commercial.....	1323
Dead, bringing home from Europe.....	1001
Dead Letters, Division of.....	878
Debt, public.....	36
Deciduous fruit insect investigations.....	1416
Demobilization, Army.....	638
Dental Corps, Navy.....	1000
Destroyers, naval.....	950
Diesel engine, use of.....	1053
Dips and disinfectants, animal.....	1309
Discipline, Army.....	413
Diseases, crop.....	1350
Distilleries.....	204
Distilling, illicit.....	741
District and cooperative offices.....	1631
District courts, United States.....	739
District of Columbia, land litigation in.....	762
Divorce, census of.....	1676
Domestic commerce. (<i>See</i> Foreign and domestic commerce.)	
Dourine, eradication of.....	1293
Drainage investigations.....	1515
Drug-plant investigations.....	1337
Drugs and pharmacology.....	1395

E.

Eagle boats.....	951
Eagles, destructiveness of.....	1449
Education: (<i>See also</i> Schools.)	
Education:	
Army officers.....	283
Army since the armistice.....	286
Board.....	1219
Bureau of.....	1074, 1114
Labor service.....	1830
System of military.....	512
Education and training, Army committee on.....	510
Educational work, Army.....	424
Electric cars, mail transportation by.....	799
Electrical industries, census of.....	1672
Electricity.....	1649
Electricity, use of in saving coal.....	1047
Elevator explosions, investigation of.....	1395
Embarkation Service, Army.....	567
Employment, conference on.....	1922
Employment Service, report of.....	1913
Employment statistics.....	1935
Engineer Corps, construction of Army.....	405
Engraving and Printing, Bureau of.....	144, 217
Entomologist, report of.....	1413

Entomology:	Page.
Bee culture.....	1433
Bureau of.....	1413
Cereal and forage crop insect investigations.....	1413
Deciduous fruit insect investigations.....	1416
Gipsy moth and brown-tail moth.....	1429
Insects affecting forest resources.....	1423
Insects affecting health of man and animals.....	1432
Insects injurious to vegetable and truck crops, investigations of.....	1421
Japanese beetle.....	1419
Southern field crop insect investigations.....	1431
Stored-product insect investigations.....	1415
Tropical and subtropical fruit insect investigations.....	1426
War activities of Bureau of.....	1435
Equipment Branch, Army.....	460
Espionage act.....	692
Espionage and trading-with-the-enemy acts, enforcement of.....	885
Experiment Station Record.....	1477
Experiment stations.....	1470
Alaska.....	1478
Guam.....	1481
Hawaii.....	1479
Insular stations.....	1477
Office of.....	1475
Porto Rico.....	1480
Virgin Islands.....	1482
Exports:	
Agricultural products.....	1227
Inspection of animals for.....	1292
F.	
Far East, promotion of trade with.....	1634
Farm and Harvest Work, Department of Labor.....	1931
Farm bookkeeping and cost accounting.....	1558
Farm business analysis studies.....	1556
Farm encumbrances, census of.....	1684
Farm equipment.....	1559
Farmers' institutes.....	1475
Farm labor problems.....	1558
Farm land problems.....	1239
Farm loan system, Federal.....	110
Farm management and farm economics.....	1245
Farm management:	
Bookkeeping and cost accounting.....	1558
Cost of production.....	1556
Crop economics.....	1557
Demonstrations.....	1501
Equipment.....	1559
Farm business analysis studies.....	1556
Live-stock economics.....	1558
Office of.....	1555
Tenancy and farm-labor problems.....	1558
Farmers, seed-grain loans to.....	113
Fats and oils.....	1388
Fats and oils, statistics of.....	1676
Federal aid road act.....	1507
Federal farm loan system.....	110
Federal Reserve System, the.....	86
Fertilizer resources investigations.....	1407
Field Force, Census.....	1682
Finance Department, Army.....	600
Finances, annual report on.....	17
Finances:	
Estimates for 1920-21.....	172
Postal Service, 1921.....	178
Receipts and disbursements.....	155
Financial operations, Army.....	343

	Page.
Financial situation, international.....	21
Financial statistics of cities.....	1674
Financial statistics of States.....	1675
Fish-cultural work, relations with the States in.....	1688
Fish-eating animals.....	1446
Fisheries:	
Alaskan Fisheries Service.....	1692
American-Canadian conference.....	1578
Aquatic products, increased utilization of.....	1691
Biological investigation of fishes.....	1688
Bureau of.....	1685
Fish-cultural work, relations with States in.....	1688
Food fishes, rescue of stranded.....	1687
Fur-bearing animals of Alaska, minor.....	1697
Fur-Sea Service, Alaskan.....	1693
Humpback salmon in Maine.....	1687
Laboratory aquarium.....	1587
Leather, new sources of aquatic.....	1692
Mosquitoes, uses of fishes in controlling.....	1691
New fish food.....	1616
Planting the waters.....	1686
Salmon hatchery, loss of a Pacific.....	1688
Seal herd, Alaskan.....	1695
Seal islands, marketing products of.....	1695
Shellfish investigations.....	1689
Flax, winter.....	1332
Fleet. (<i>See</i> Navy.)	
Fleet, work of in European waters.....	901
Flour and cereals, analysis of.....	1394
Food and drugs act.....	745
Food and drugs act, enforcement of.....	1381
Food commission, allied.....	422
Food fishes, rescue of.....	1687
Food flour, spoilage and fermentation.....	1397
Forage crops.....	1335
Food, new fish.....	1616
Food products inspection service.....	1547
Food surveys.....	1532
Forecast Service.....	1562
Foreign and domestic commerce:	
Attachés in Europe, activities of.....	1622
Bureau of.....	1619
Commercial information, demand for.....	1637
District and cooperative offices.....	1631
Editorial division.....	1642
Far-Eastern offices, results obtained in.....	1626
Far East, promotion of trade with.....	1634
Foreign statistics, original research and compilation of.....	1641
Foreign trade.....	1621
Latin America.....	1627
Latin America, work in connection with.....	1632
Recommendations.....	1643
Russian division, establishment of.....	1636
Statistics, division of.....	1638
Tariffs, division of foreign.....	1641
Trade commissioners, vital work accomplished by.....	1628
Foreign exchanges—French credits adjusted.....	993
Foreign governments, loans to.....	53
Foreign mail service.....	782
Foreign marketing investigation.....	1530
Foreign statistics, original research and compilation of.....	1641
Foreign trade.....	1621
Forest resources, insects affecting.....	1423
Forest Service:	
Forestry practice, extension of.....	1354
Investigation.....	1378

Forest Service—Continued.	Page.
Live-stock associations.....	1368
Management.....	1361
National forests.....	1354
Research.....	1373
States, cooperation with.....	1372
Water power.....	1368
Forestry, extension of.....	1244
Forester, report of (<i>see also</i> Forest Service).....	1354
Fourteenth census law.....	1680
Fraud orders, postal.....	886
Free mail privilege.....	858
Freight, shipment of mail by fast.....	799
Fruits and vegetables, dehydration of.....	1393
Fur-bearing animals.....	1445
Fur-bearing animals of Alaska.....	1697
Fur-seal service, Alaskan.....	1693

G.

Game, killing of, in National forests.....	747
Game laws.....	1457, 1460
Garden homes for the people.....	1058
General education board.....	1219
General Land Office (<i>see also</i> Public Lands).....	1069, 1088
General Staff, control, necessity for.....	442
General Supply Committee.....	148
Geological Survey.....	1076, 1118
German offensives of 1918 and related allied agreements.....	362
German ships employed by Navy.....	911
Germany:	
Advances into.....	392
American forces in.....	278
Gipsy moth and brown-tail moth.....	1429
Glanders.....	1304
Gold.....	92
Gold and silver, production of.....	196
Gold coin, export of.....	196
Gophers, pocket.....	1442
Government agencies, incorporated.....	103
Government obligations, illegitimate traffic in.....	80
Government officers and employees, salaries of.....	108
Grades and standards, market.....	1523
Grain marketing investigations.....	1537
Grain mill, elevator, and cotton gin explosions, investigation of.....	1395
Grain sorghums.....	1317, 1332
Grain standardization, handling, and transportation.....	1538
Grain standards act, enforcement of United States.....	1551
Grape insects.....	1418
Greenhouses, census of commercial.....	1679
Ground squirrels.....	1441
Guam.....	1029
Agricultural Experiment Station.....	1481
Guantanamo, naval exercises at.....	905
Gunnery, naval.....	906
Guns for battleships.....	954

H.

Haiti and San Domingo.....	1028
Hawaii.....	1203
Agricultural Experiment Station.....	1479
Naval reception.....	901
Pearl Harbor dock.....	960
Heat.....	1655
Helium production plant.....	922
High cost of living.....	687
Highways. (<i>See</i> Public Roads.)	

	Page.
Highways weather service.....	1566
Hog-cholera Control Division.....	1300
Hog-cholera investigations.....	1306
Hogs, roundworms.....	1312
Home demonstration work and girls' club work.....	1488
Home economics.....	1503
Homes and farms, incumbrances, census of.....	1684
Homestead designations.....	1224
Horses, Army.....	404
Horticultural and agronomies investigations.....	1316
Hospitals. ships.....	998
Hours-of-service act.....	744
Housing and transportation, labor, bureau of.....	1842
Humpback salmon in Maine.....	1687

I.

Ice cream cone cases.....	724
Immigration:	
Administrative fines.....	1882
Asiatic.....	1896
Contract labor.....	1877
Future.....	1884
Insular United States.....	1876
Japanese.....	1893
Oriental.....	1878
Passport visé system abroad.....	1898
Report of Bureau of.....	1872
Seamen.....	1881
Statistics, a century of.....	1883
War activities.....	1880
War necessities, importation of labor for.....	1878
Indebtedness, certificates of.....	46
Indian Affairs.....	1071, 1100
Depredation cases.....	738
Suits to cancel unlawful conveyances of allotments.....	759
White Earth Indian Reservation, allotments in the.....	760
Indian agencies, inspection of animals for.....	1294
Indian land laws, enforcement of.....	749
Industrial Board.....	1612
Industrial conference, National.....	1750
Industrial Cooperation Service.....	1613
Industrial laboratory building.....	1585
Industrial laboratory, new.....	1668
Industrial progress.....	1670
Industry. (<i>See</i> Commerce, Department of.)	
Influenza.....	140
Influenza, anthrax, and other diseases, control of.....	1294
Influenza epidemic, special investigation of.....	1677
Information and Education Service, labor.....	1830
Insect investigations, stored product.....	1415
Insecticide and fungicide act.....	746
Insecticides and fungicides.....	1398
Insects. (<i>See</i> Entomology.)	
Inspection and survey, naval board of.....	1027
Inspection service, postal.....	881
Inspector General's Department, Army.....	332
Insular Affairs.....	339
Insurance companies, enemy or ally of enemy insurance.....	134
Insurance, war-risk (<i>see</i> War-risk Insurance).....	123
Insured postal parcels.....	871
Interior, Department of:	
Alaskan Engineering Commission (<i>see also</i> Alaskan Engineering Commission).....	1083
Coal as a national asset.....	1039
Coal strike.....	1037
Education, Bureau of (<i>see also</i> Education, bureau of).....	1074

Interior, Department of—Continued.	Page.
General Land Office (<i>see also</i> General Land Office).....	1069
Geological Survey (<i>see also</i> Geological Survey).....	1076
Indian Office (<i>see also</i> Indian Affairs).....	1071
Land development.....	1057
Mines, Bureau of (<i>see also</i> Mines, Bureau of).....	1081
National Park Service (<i>see also</i> National Park Service).....	1084
National stock taking.....	1038
Pensions, Bureau of (<i>see also</i> Pensions).....	1073
Reclamation Service (<i>see</i> Reclamation Service).....	1080
Secretary of, report of.....	1037
Solicitor of.....	1087
Territories, the.....	1182
Internal Revenue:	
Administration, cost of.....	200
Alcohol, denatured.....	204
Bureau of.....	118, 199
Capital-stock Tax.....	202
Child-labor tax law (<i>see also</i> Child Labor).....	202
Distilled spirits.....	203
Distilleries, industrial.....	204
Estate tax.....	202
Fermented liquors.....	205
Prohibition enforcement.....	205
Revenue act of 1918.....	200
Synthetic glycerine formula.....	123
Taxes, income and profits.....	201
Taxes on sales, special and miscellaneous commodities, occupations, and admissions and dues.....	203
Wines and cordials.....	205
International High Commission.....	150
International Labor Conference.....	1746
International obligations, liquidation of.....	300
International Radiotelegraphic Conference.....	1736
International Statistical Year Book.....	1677
Interstate Commerce. (<i>See also</i> Commerce.)	
Interstate Commerce, Ash-pan act.....	745
Interstate Commerce:	
Cases arising out of orders of the Commission.....	748
Cases under act to regulate.....	733
Commodity clause under the.....	733
Hours-of-service act.....	744
Live-stock sanitary work in.....	1295
Railway mail pay hearings.....	799
Rebates and unlawful discriminations.....	733
Safety-appliance acts.....	744
Twenty-eight-hour law.....	745
Investigation and Labor Inspection Service.....	1818
Italy, American troops in.....	391
J.	
Jack rabbits and cottontails.....	1441
Japan and Philippines, radio circuit reopened to.....	985
Japanese beetle.....	1419
Japanese immigration.....	1893
Judges. (<i>See also</i> Justice, Department of.)	
Justice, Department of:	
Abstracts of decisions.....	705
Admiralty litigation.....	689
Alien enemies—	
Naturalization of.....	698
Regulation of conduct of.....	695
Animal-quarantine act.....	746
Antitrust division.....	723
Appeals to Supreme Court from Court of Claims.....	738
Ash-pan act.....	745

Justice, Department of—Continued.

	Page.
Attorney General, report of.....	671
Automobile accessories case.....	726
Banking laws, violation of national.....	743
Bankruptcy law, amendment of.....	674
Bankruptcy, statute of limitation in.....	673
Cantaloupe Exchange cases.....	725
Cases finally determined.....	724
Cases instituted since July 1, 1918.....	732
Chicago labor union cases.....	725
Claims against the United States, bureau for defense of.....	733
Colgate case.....	727
Commerce, cases under act to regulate (<i>see also</i> Interstate Commerce).....	733
Congressional cases.....	738
Coos Bay wagon road grant.....	752
Corn products case.....	726
Court of Claims.....	737
Criminal Identification, Bureau of.....	769
Criminal prosecutions, miscellaneous.....	742
Customs cases.....	763
Customs cases, reappraisement in.....	675
Defrauding the United States.....	672
Departmental activities.....	676
Distilling, illicit.....	741, 744
District courts, United States.....	739
Espionage act.....	692
Federal law, violation of.....	683
Federal officer, killing of.....	672
Food and drugs act.....	745
Government property, thefts of.....	672
High cost of living.....	687
Hours-of-service act.....	744
Ice-cream cone case.....	724
Illegal allotments, suits to cancel.....	761
Indian depredation cases.....	738
Insecticide and fungicide act.....	746
Internal-revenue, tax, prohibition, and miscellaneous-matters division.....	743
Investigation, Bureau of.....	682
Jensen Creamery case.....	725
Judges, United States district, assignment to occasional services.....	672
Jurisdiction cases, general.....	737
Juvenile court.....	673
Klaxon Horn case.....	725
Land litigations in the District of Columbia, report of attorney in charge of.....	762
Letters, threatening.....	672
Liquor laws.....	743
Meat-inspection act.....	746
Oil lands reserved by Executive order.....	752
Opinions.....	690
Oregon and California railroad land-grant suit.....	751
Parole and pardon board.....	674
Patented inventions, litigations arising out of use by United States of.....	736
Pending cases instituted prior to July 1, 1918.....	727
Per diem, increase in.....	675
Philadelphia Tile Dealers' case.....	726
Plant-quarantine act.....	747
Postal laws, cases arising under.....	740
Prisons, pardons, and paroles.....	765
Public land and Indian land laws, enforcement of.....	749
Public Lands Division.....	749
Pueblo of Santa Rosa case.....	758
Recommendations.....	671
Records, preparation and printing of.....	673
Sabotage.....	694
Safety-appliance acts.....	744

Justice, Department of—Continued.

	Page.
Selective-service cases	691
Solicitor General, report of	702
Solicitors, reports of	764
Southern Pacific Railroad Company, concerning oil lands, suits against ..	755
Stenographers before grand juries, presence of	672
Sunk Land cases in Arkansas	756
Supreme Court of United States, portraits of justices of the	676
Tile Dealers' case, Philadelphia	726
Titles, report of attorney in charge of	762
Trading-with-the-enemy act	700
Twenty-eight-hour law	745
War activities	691
War fraud matters, investigation of	742
Water rights	756
White Earth Indian Reservation, allotments in	760
White-slave-traffic act, enforcement of	742
Juvenile court	673

K.

Klaxon Horn cases	725
Knapp, Admiral	940

L.

Labor, Department of:

Administrative assignments, temporary	1937
Administrative offices	1923
Appointment Division	1862
Assistant Secretary	1859
Bureaus of	1870
Children's Bureau (<i>see also</i> Children's Bureau)	1899
Conciliation, Division of	1757
Departmental cabinet, the	1859
Employment, conference on	1922
Employment Service (<i>See also</i> Employment Service)	1913
Employment statistics	1935
Farm and harvest work	1931
Housing and Transportation, Bureau of	1842
Immigration, Bureau of (<i>see also</i> Immigration)	1872
Industrial Conference, National	1750
Information and Education Service	1830
International Labor Conference	1746
Investigation and Inspection Service	1818
Labor Statistics, Bureau of	1870
Living Conditions, Commission on	1851
Naturalization, Bureau of (<i>see also</i> Naturalization)	1908
Negro Economics, Division of	1791
Per diem, increase in	1939
Post-war activities	1921
Recommendations	1937
Secretary, report of	1745
Solicitor	1862
Special services	1919
Superannuation and retirement	1938
Training Service, United States	1822
Unemployment, measures for relief of	1939
War Labor Board, National	1779
War Labor Policies Board	1794
Woman in Industry Service	1798
Workers, training of	1938
Working Conditions Service	1853
Labor problems, farm	1558
Labor Union cases, Chicago	725
Latin America, work in connection with	1632
Latin American commerce	1627
Leather and tanning	1400
Leather, new sources of aquatic	1692

Liberty bonds:	Page.
Acceptance of, as security.....	73
Conversion of.....	64
Navy.....	1033
Permanent form, coupon.....	77
Purchases of.....	69
Liberty bonds and Victory notes.....	60
Acceptance of, in payment of estate or inheritance taxes.....	74
Authorizations for issues of.....	78
Exchange and transfer of.....	68
Official titles of.....	78
Tax exemption of.....	81
Liberty loan:	
Census Bureau work.....	1679
Fourth.....	37
National Woman's Committee.....	59
Subscriptions by persons in the military and naval forces.....	73
Subscriptions in default.....	76
Victory.....	38
Life and property, saving of.....	1704
Life-saving medals, awards of.....	246
Life tables, United States.....	1676
Light.....	1658
Lighthouses:	
Administration.....	1704
Apparatus and equipment, improvement of.....	1703
Appropriations for special works.....	1707
Bureau of.....	1698
Cooperation with navy and war departments.....	1698
Depots.....	1702
Legislation needed, special.....	1705
Life and property, saving of.....	1704
Navigation, aids to.....	1699
Personnel.....	1704
Vessels.....	1701
Vessels needed for bureau of.....	1582
Liquidation abroad, Army.....	305
Liquidation Commission, United States.....	420
Liquidation of international obligations.....	300
Liquor laws.....	743
Liquors. (See Internal revenue.)	
Live Stock. (See Animal industry.)	
Live stock:	
Associations.....	1368
Dealers.....	1554
Economics.....	1558
Marketing.....	1536
Transportation and quarantine laws, violations of.....	1295
Living conditions, Commission on.....	1851
Living, high cost of.....	687
Load line, measurement, bulkheads.....	1737
Loans and currency, report of.....	247
Loans to Foreign Governments.....	53
Lotteries.....	886

M.

Mail. (See Postal Service.)	
Mammal and bird reservations.....	1451
March, Gen. Peyton C., report of.....	427
Marine and seamen's insurance.....	126
Marine Hospitals and Relief, Division of.....	242
Marine meteorology observations.....	1562
Marine services, commerce vessels in.....	1579
Marketing and distribution of agricultural products.....	1251
Markets.....	1523
Bureau of.....	1523
Business practice.....	1529

Markets—Continued.	Page.
Car-lot shipments.....	1535
City marketing and distribution.....	1526
Cotton.....	1539
Cotton standards.....	1541
Cotton testing.....	1541
Cotton-warehouse investigation.....	1540
Dairy products.....	1536
Emergency traffic and storage assistance.....	1546
Food products inspection service.....	1547
Food surveys.....	1532
Foreign marketing investigation.....	1530
Grades and standards.....	1523
Grain investigations.....	1537
Grain standardization, handling and transportation.....	1538
Grain standards act, enforcement of the United States.....	1551
Investigation and demonstration work.....	1525
Live stock, meats, and animal by-products.....	1536
Motor transportation.....	1528
News service.....	1542
Regulatory work.....	1549
Rural cooperation.....	1531
Seed-reporting service.....	1545
Service work.....	1542
States, cooperation with.....	1532
Storage reports.....	1548
Transportation and storage.....	1527, 1534
Warehouse act, administration of.....	1553
Marine Corps:	
Authorized strength of.....	1013
Casualties.....	1009
Depot of supplies, Philadelphia.....	1015
Hindenburg line, destroyed.....	1005
Marines complete splendid service abroad.....	1002
Parris Island and Quantico training stations.....	1016
Pontanezen, what Marines did at.....	1010
Recruiting and recruit depots.....	1012
Rhine, the march to the.....	1007
San Diego, new base at.....	1016
Service in France.....	998
Splendid service abroad.....	1002
Maritime facts.....	1730
Marriage and divorce, census of.....	1676
Materials.....	1662
Sale of Army.....	306
Matanuska coal.....	1067
Meat and products, labeling of.....	1288
Meat inspection.....	1265
Meat-inspection act.....	746
Meat Inspection Division.....	1284
Meat-inspection laboratories.....	1289
Medical Department, Army.....	332
Medical officers, Navy.....	999
Medical service abroad, naval.....	998
Message of the President.....	5
Metals.....	1666
Meteorology, agricultural.....	1574
Meteorology for military operations.....	1561
Meuse-Argonne operation.....	380
Mice, wood rats and cotton rats.....	1443
Migratory-bird treaty act.....	747
Migratory-bird treaty and Lacey Acts.....	1455
Military education, system of.....	512
Military Intelligence Division, Army.....	514
Military justice.....	291, 413
Military mail.....	780
Military mail service abroad and censorship.....	784

	Page.
Military policy, permanent.....	309
Militia Bureau	339
Milk investigations and demonstrations.....	1279
Miners' year.....	1041
Mines, Bureau of.....	1081, 1148
Mint Service:	
Appropriations, expenses, and incomes.....	196
Coin and bullion stock in United States.....	196
Gold and silver, production of.....	196
Gold coin, export of.....	196
Industrial arts.....	196
Operations of mints and assay offices.....	194
Report of.....	194
Mobilization of Army forces.....	446
Moles.....	1444
Money-order system, postal.....	865
Moneys, public.....	94
Morale branch, Army.....	635
Morale work in Army.....	287
Mosquitoes, uses of fishes in controlling.....	1691
Motion pictures in industry.....	1591
Motor boats, regulation of.....	1739
Motor transportation of farm products.....	1528
Motor transport branch, Army.....	478
Motor Transport Corps, Army.....	408
Motor truck service, parcel post.....	846
Motor vehicle service, Government-owned.....	813
Munitions, Army.....	409

N.

National banks, bond-secured circulation of.....	96
National banking laws, violation of.....	743
National Defense, Council of.....	1027
National forests.....	1356
Game, killing of.....	747
Roads.....	1512
National Park Service.....	1084, 1157
National parks, wild life in.....	1451
National rifle matches held on Navy range.....	1022
National training schools.....	768
Naturalization:	
Americanization work.....	1909
Finances.....	1909
Of alien enemies.....	698
Report of.....	1908
Soldiers and sailors.....	1912
Naval Academy:	
Chapel, new, fitting war memorial.....	975
Hazing in its inception, stamping out of.....	975
Houses needed for teaching force.....	974
Improvement and extension.....	974
Midshipmen at.....	971
Post-graduate school.....	973
Reserve officers trained.....	974
Naval Consulting Board.....	1025
Naval history recorded.....	1031
Naval intelligence.....	1031
Naval Observatory's work and plan.....	1030
Naval stores.....	1401
Naval War College.....	976
Admiral Sims returns to presidency of.....	978
Navigation:	
Bureau of.....	1726
Hulls, subdivision of.....	1732
International radiotelegraphic conference.....	173

Navigation—Continued.	Page.
Laws, enforcement of.....	1738
Load line, measurement, bulkheads.....	1737
Maritime facts, main.....	1730
Maritime problems.....	1731
Motor boats.....	1739
Radio communication.....	1734
Receipts.....	1733
Shipping Commissioners.....	1733
Tonnage, world's.....	1727
Navigational instruments and methods.....	924
Navy (<i>see also</i> Marine Corps):	
Academy (<i>see also</i> Naval Academy).....	971
Activities completed.....	943
Activities in England and France.....	930
Activities remaining in effect.....	945
Aeronautics, Joint Army and Navy Board on.....	926
Aeroplane engines.....	958
Aircraft factory.....	927
Aircraft operations with fleet.....	927
Air service in Europe, caring for.....	998
Air service, objections to creating separate.....	925
Airship of largest type purchased by the Navy.....	921
Alaskan coal fields.....	992
Antisubmarine operations.....	929
Appropriations for war, total net.....	993
Armor plant.....	957
Atlantic and Pacific fleet organization.....	895
Atlantic, first to fly across.....	915
Atlantic Fleet goes south.....	906
Aviation an integral part of the service.....	924
Battleships' service in Europe.....	901
Battleships supplied with planes.....	925
Beatty, Admiral.....	903
Benson, Admiral.....	939
"Blimps" make new world record.....	923
Bonus and travel allowance.....	967
British Grand Fleet, services with.....	903
Building program.....	995
Capital ships under construction.....	948
Cargo ships.....	914
Cargo vessels converted into transports.....	910
C-5 makes flight from Montauk to St. John.....	923
Coal and oil required.....	992
Coast and lighthouse service.....	1032
Coast Guard's service.....	1032
Codes, ciphers, and signal books.....	987
Compensation Board.....	1027
Contracts canceled.....	987
Courts-martial.....	1016
Crane installed at Philadelphia Navy Yard.....	961
Cruiser and transport force.....	914
Dead, bringing home remains of our.....	1001
Demobilization of forces in European waters.....	941
Demobilization, progress of.....	963
Dental Corps.....	1000
Destroyers.....	950
Destroyers and patrol craft returned.....	904
Disbursing officer.....	993
Distinguished service recognized.....	1029
Dry docks opened.....	959
Eagle boats.....	951
Electric machinery in navy yards.....	958
Estimates for fiscal year.....	995
European forces, demobilization of.....	941
Excess stocks utilized.....	989
Fire control, standardized practice.....	907
F-5 flying boat.....	923

Navy—Continued.

	Page.
First to fly across Atlantic.....	915
Fleet bases, storage facilities.....	962
Force, efficiency of.....	913
Forces in Europe, operations of.....	942
Foreign cooperation.....	948
Foreign exchange; French credits adjusted.....	993
General Board.....	1024
German ships employed.....	911
Guantanamo, exercises held at.....	905
Gunfire, studying cause of errors in.....	907
Gunnery exercises conducted.....	906
Guns for battleships.....	954
Haiti and Santo Domingo.....	1028
Hawaii reception.....	901
Helium production plant.....	922
Hospital corpsmen on cargo ships.....	998
Improvements in navy yards.....	961
Increased effectiveness of.....	897
Inspection and Survey, Board of.....	1027
Italy aided in operations against Austrians.....	931
Justice to men of.....	965
Knapp, Admiral.....	940
Liberty bonds.....	1033
Maintenance and repairs.....	947
Marine regiments in France, service with.....	998
Medical officers needed.....	1000
Medical personnel, reduction in.....	994
Medical service abroad.....	998
Merchant marine aided by radio compasses.....	985
Methods of making guns improved.....	955
Mines laid.....	936
National rifle matches.....	1022
Naval War College (<i>see also</i> Naval War College).....	976
Navigational instruments and methods.....	924
Navy yards (<i>see also</i> Navy)—	
And bases on the Pacific.....	957
Great Pearl Harbor Dock.....	960
Shipbuilding dock at Puget Sound.....	961
NC-4, flight of the.....	918
NC-4 reaches Horta.....	918
New fleet organization, Atlantic and Pacific.....	895
North Sea barrage.....	933
Ordnance production.....	956
Pacific fleet, reception to the.....	900
Panama Canal utilized, advantages of.....	896
Peace treaty.....	1034
Personnel.....	962
Prison.....	1018
Provisions and clothing, surplus.....	990
Puget Sound, President reviewed fleet in.....	900
Purchases, reduction in.....	989
Radio station in France.....	987
Radio system.....	983
Radio transmitted by seaplane.....	923
Range.....	1022
Ration; allowance on ships standardized.....	990
Records in construction.....	951
Recruiting campaign.....	969
"Red-light" districts kept closed.....	1021
Rehabilitation and vocational training.....	1000
Reserve officers released.....	968
Reserve of officers and men.....	927
Resignations and compensation.....	968
Resignations, causes of, Naval Academy.....	975
Review of.....	902
Roosevelt, Assistant Secretary.....	940
Salary reclassification needed.....	996

Navy—Continued.		Page.
Salvage and sales.....		988
Samoa and Guam.....		1029
Seaplane Division organized.....		916
Secretary, report of.....		889
Self-government plan, results of.....		1019
Shipping Bulletin has wide circulation.....		987
Sick and wounded on transports.....		996
Sims, Admiral.....	940,	978
Sixteen-inch gun, development of.....		954
Social Hygiene Board.....		1020
Stations in France.....		930
Storehouses for fleet supplies, fireproof.....		992
Submarine raids necessitated new escort.....		913
Surgeon General, honors to.....		1001
Surplus stocks reduced, Navy Department.....		987
Tactics, unparalleled development in.....		905
Target practices.....		906
Telegraph and telephone system.....		986
Torpedo factory.....		957
Training school, permanent.....		971
Transportation of troops.....		912
Troops brought home.....		907
Turkish waters.....		946
Vessels, small yachts and motor boats sold.....		989
Virgin Islands.....		1028
Volunteer transfer.....		966
War cost of.....		994
War-risk insurance.....		1033
Warships used to transport troops.....		909
Welfare organizations, gratitude to.....		983
Welfare work for.....		980
Women in the.....		1032
Wool sold at auction.....		988
Work abroad since armistice.....		939
Negro Economics, Division of.....		1791
News service, market.....		1542
Nitrate of soda, purchase and storage of.....		1548
Nitrogen.....		1408
North and West, agricultural extension work in.....		1492
North Sea barrage.....		933
Nut insects.....		1418
Nut investigations.....		1323
O.		
Oats.....		1331
Obscene and indecent matter.....		887
Occupied territory, civil administration of.....		418
Ocean mail service.....		784
Ocean tonnage.....		401
Officers in the Army, higher education of.....		283
Official Register of the United States.....		1676
Oil (<i>see also</i> Petroleum).....		1049
Foreign supply wanted.....		1054
Required by Navy.....		992
Shale.....		1051
Operations Division, Army.....		445
Optical glass, history of production of.....		1657
Ordnance production, Navy.....		956
Oriental immigration.....		1878
Ornithology, economic.....		1445
P.		
Pacific cable situation.....		1591
Pacific Fleet, reception to the.....		900
Panama Canal.....	155,	341
Naval advantages of.....		896

	Page.
Paper and fabrics.....	1401
Parasites:	
Miscellaneous investigations on animal.....	1314
Treatment and control of external.....	1313
Treatment for internal.....	1313
Parcel post, international.....	783
Park Service. (<i>See</i> National Park Service.)	
Parole and pardon board.....	674
Paroles and pardons.....	765
Passport visé system abroad.....	1898
Pasture improvement.....	1318
Patent Office.....	1114
Patented inventions, litigation arising out of.....	736
Pathological Division, Bureau of Animal Industry.....	1301
Peace conference, statistics relative to foreign countries.....	1679
Peace organization, Army.....	443
Peace treaty and the Navy.....	1034
Pension Office.....	1109
Pensions.....	1073
Pershing, Gen. John J., report of.....	345
Supply coordination, munitions, and administration.....	397
Personnel:	
Reclassification of Army.....	405
Replacements of Army.....	403
Petroleum, age of.....	1049
Pharmacology.....	1395
Philippines, radio circuit reopened to.....	985
Phosphates.....	1408
Physiological investigations.....	1346
Puget Sound, shipbuilding dock at.....	961
Plant breeding.....	1328
Plant chemistry.....	1396
Plant Industry:	
Agronomics and horticultural investigations.....	1316
Cereal pathology.....	1346
Citrus-canker eradication.....	1354
Citrus trees, spray mixtures for.....	1352
Congressional seed distribution.....	1342
Crop diseases.....	1350
Crop plants abroad, seeking new.....	1335
Crop plants and crop extension.....	1330
Crop utilization.....	1337
Forage crops.....	1335
Physiological investigations.....	1346
Report of Chief of Bureau of.....	1316
Seed supplies, investigations of.....	1339
Soil-fertility investigations.....	1342
Viticultral investigations.....	1319
White-pine blister rust.....	1353
Plant poisoning of stock.....	1305
Plant-quarantine act.....	747
Pneumatic tubes, Postal Service.....	817
Pontanezen, what marines did at.....	1010
Population, special censuses of.....	1676
Porto Rico Agricultural Experiment Station.....	1480
Postal savings deposits, bonds for.....	886
Postal Service (<i>see also</i> Post Office Department):	
Aerial service, world's only successful.....	788
Air-mail postage, reduction in rates of.....	788
Air-mail service.....	784
Air-mail's contribution to aviation.....	787
Appropriations, estimates of, for 1921.....	180
Bonds offered as securities for postal-savings deposits.....	886
Buildings.....	820
Cases arising under.....	740
City delivery.....	811
Clerk hire at third-class offices.....	841

Postal Service—Continued.	Page.
Collect-on-delivery service.....	872
Cost accounting.....	854
Dead Letters, Division of.....	878
Electric cars, mail transportation by.....	799
Employees, salary and status of.....	834
Equipment and supplies.....	848
Espionage and trading-with-the-enemy acts, enforcement of.....	885
Finances.....	178, 773
Foreign mail service.....	782
Fraud orders.....	886
Free mail privilege.....	858
Freight shipments of blue-tag mail by fast.....	799
Government buildings and post-office quarters.....	822
Government buildings, selection of sites for.....	820
Guaranty fund in lieu of bonds.....	842
Improvements and extensions in.....	776
Increased volume of mail.....	778
Inspection service.....	881
Lotteries.....	886
Military mail.....	780
Military mail service abroad and censorship.....	784
Money-order system.....	865
Motor-vehicle service, Government owned.....	813
Obscene and indecent matter.....	887
Ocean mail service.....	784
Organizations.....	825
Parcel post, international.....	783
Parcel-post motor-truck service, rural.....	846
Parcels, insured.....	871
Pneumatic tubes.....	817
Postage, receipts from.....	858
Postmasters—	
Appointment of.....	829
Claims for reimbursements for losses.....	887
Salaries of.....	833
Post-office service.....	806
Post offices and contract stations, branch.....	809
Post offices—	
First and second classes, personnel in.....	835
Increased salaries of employees in.....	837
Unusual conditions at.....	841
Public buildings used for postal services, physical valuation of.....	819
Purchases.....	854
Railroads, compensation to.....	797
Railway mail service.....	800
Readjustment of.....	803
Registered mail.....	869
Retirement.....	840
Rural mail service.....	843
Savings system.....	860
Screen-wagon contractors and mail messengers, payments to.....	813
Second-class mail privilege, correction of abuses of the.....	794
Second-class matter.....	789
Stamped paper.....	873
Star-route service.....	846
Statistics.....	888
Telegraphs and telephones.....	795
Undeliverable mail, forwarding and returning of.....	857
Underground electric railway for delivery of mail in New York.....	818
Village delivery.....	847
War activities.....	779
War, cost of, to the Post Office Department.....	887
Weight of first-class matter increased, limit of.....	856
Postmaster General, report of. (<i>See</i> Postal Service.)	
Postmasters. (<i>See</i> Postal Service.)	
Post Office Department, Postmaster General, report of (<i>see also</i> Postal Service).....	773

	Page.
Potash.....	1409
Potato investigations.....	1325
Poultry. (<i>See also</i> Animal industry.)	
Poultry and eggs.....	1391
Poultry diseases.....	1305
Poultry investigation.....	1271
Power sites.....	1223
Prairie dogs.....	1440
Predatory animals and rabies.....	1437
President, annual message of.....	5
Printing and binding, Commerce Department.....	1611
Prison, Navy.....	1018
Prisoners of war.....	416
Prisons, pardons and paroles.....	765
Prohibition, enforcement of.....	205
Property, disposal of Army.....	653
Provost Marshal General, census work for.....	1679
Provost Marshal General's Department.....	414
Public buildings (<i>see also</i> Supervising Architect)	140
Commerce, Department of.....	1583
Contractors' relief act.....	141
National archives.....	142
Postal Service.....	819
Post-office quarters.....	822
Sites for postal.....	820
Public debt.....	36
Public expenditures, economy in.....	28
Public Health Service.....	137
After-the-war program.....	138
Education.....	243
Influenza.....	140
Marine Hospitals and Relief, Division of.....	242
Quarantine and Immigration, Division of.....	238
Quarantine, Division of Interstate.....	233
Recommendations.....	244
Report of Surgeon General.....	229
Sanitary Reports and Statistics, Division of.....	241
Scientific Research, Division of.....	229
Venereal Diseases, Division of.....	243
Public lands (<i>see also</i> General Land Office):	
Classification of.....	1221
Development of.....	1057
Division in Department of Justice.....	749
Homestead designations.....	1224
Power sites.....	1223
Soldier-settlement legislation.....	1063
Public Moneys, Division of.....	255
Public roads.....	1253
Appropriations, continuation of Federal.....	1259
Building and maintenance investigation.....	1513
Drainage investigations.....	1515
Farm irrigation investigation.....	1514
Federal-aid act.....	1507
Highway Council, United States.....	1506
Machinery needed, no additional administrative.....	1256
Management and economics.....	1514
Material tests and research.....	1520
National forest roads.....	1512
Regulations, new.....	1508
Report of Chief of Bureau of.....	1506
Rural engineering.....	1517
War equipment, supplies and materials, distribution of.....	1512
Public utilities.....	1652
Publications of Military Intelligence Division.....	516
Publicity, war loan.....	58
Purchase and Storage, office of Director of Army.....	608

	Page.
Purchase, Storage, and Traffic Division, Army.....	528
Purchasing agency, Army.....	400

Q.

Quarantine and Immigration, Division of Foreign and Insular.....	238
Quarantine Division, animal.....	1290
Quarantine, Division of Interstate.....	233
Quartermaster Corps, Army.....	407

R.

Rabbits, domestic.....	1444
Rabies.....	1304
Radio communication.....	1734
Radio compasses aid to merchant marine.....	985
Radio station in France.....	987
Radio system in Navy.....	983
Radio transmitted by seaplane.....	923
Radiotelegraphic conference, international.....	1736
Radium.....	1654
Range improvement.....	1318
Railroad Administration, checking account of.....	106
Railroads, mail compensation to.....	797
Railway mail pay, hearings by Interstate Commerce Commission on question of.....	799
Railway Mail Service. (See Postal Service.)	
Employees, increased salaries of.....	802
Operation of.....	802
Personnel in.....	802
Reclamation Service.....	1080, 1126
District organization.....	1060
Recruiting and recruit depots, Marine Corps.....	1012
Recruiting campaign, Navy.....	969
Regulatory work, markets.....	1549
Religious bodies, census of.....	1673
Religious work, Army.....	423
Remounts, Army.....	404
Reserve officers released, Navy.....	968
Reserve officers' training corps, 1919, activities of.....	277
Retirement of civil-service employees.....	109
Retirement, Postal Service.....	840
Revolving funds and reimbursements of appropriations.....	100
Rhine, march to the.....	1007
Rice.....	1317, 1332
Rice damaged by wild fowl.....	1448
River and flood warnings.....	1567
Roads (see also Public roads).....	1253, 1506
Rodent control.....	1439
Roosevelt, Assistant Secretary of the Navy.....	940
Rural conditions, need for broad of survey of.....	1262
Rural engineering.....	1517
Rural Mail Service (see also Postal Service).....	843
Changes in personnel in.....	845
Rural marketing cooperation.....	1531
Russia, American troops in.....	279, 392
Russian division, establishment of.....	1636

S.

Sabotage.....	694
Safety-appliance acts.....	744
St. Mihiel operations.....	375
Salaries of Government officers and employees.....	108
Salary reclassification, Navy.....	996
Sales abroad, Army.....	302
Salmon hatchery, loss of a Pacific.....	1688
Samoa and Guam.....	1029

	Page.
Save and develop Americans.....	1068
Savings system, postal.....	860
Scabies, eradication of.....	1293
Schools (<i>see also</i> Education), officers and enlisted men, Army.....	286
Schools, agricultural instruction in.....	1474
Sea foods.....	1389
Seal herd, Alaskan.....	1695
Seal Islands, marketing products of.....	1695
Seamen, immigration of.....	1881
Second-class mail matter.....	789
Second-class mail privilege, correction of abuses of the.....	794
Secret Service Division.....	257
Secretary of Agriculture, report of.....	1225
Secretary of Commerce, report of.....	1557
Secretary of the Interior.....	1037
Secretary of Labor, report of.....	1745
Secretary of the Navy, report of.....	889
Secretary of the Treasury, report of.....	17
Secretary of War, report of.....	259
Seed distribution, congressional.....	1342
Seed-grain loans to farmers.....	113
Seed-reporting service.....	1545
Seed supplies, investigations of.....	1339
Seismology, investigations in.....	1576
Selective service cases.....	691
Selective service record division.....	331
Service schools, Army.....	285
Service work, market.....	1542
Services of Army supply.....	397
Shellfish investigations.....	1689
Shipbuilding, census of.....	1672
Shipbuilding Board, census information for.....	1679
Shipping bulletin has wide circulation.....	987
Shipping Commissioners, navigation.....	1733
Ships, hospital service on.....	998
Siberia, American Expeditionary Force.....	280
Signal Corps, Army.....	408
Silver.....	92
Sims, Admiral.....	940, 978
Smyrna figs, commercial culture of.....	1322
Social Hygiene Board.....	1020
Soil-fertility investigations.....	1342
Soils:	
Chemical investigations.....	1407
Fertilizer resources investigations.....	1407
Nitrogen.....	1408
Phosphate.....	1408
Physics.....	1412
Potash.....	1409
Report of chief of bureau of.....	1402
Survey.....	1402
Solar radiation, investigations in.....	1575
Soldier-settlement legislation.....	1063
Soldiers and sailors, naturalization of.....	1912
Solicitor General, report of.....	702
Solicitor's office, Department of Commerce.....	1611
Solicitors, reports of.....	764
South, agricultural extension work in.....	1483
Spray mixtures for citrus trees.....	1352
Stamped paper.....	873
Standard container act, enforcement of.....	1554
Standards:	
Aeronautical instruments.....	1665
Bureau of.....	1585, 1645
Chemistry.....	1661
Dynamometer and altitude laboratory.....	1587

Standards—Continued.	Page.
Electricity.....	1649
Heat.....	1655
Industrial laboratory, new.....	1668
Industrial progress, bureau of.....	1670
Light.....	1658
Materials.....	1662
Metals.....	1666
Optical glass, history of production of.....	1657
Public utilities.....	1652
Radium.....	1654
Weights and measures.....	1646
Star Route Mail Service.....	846
Stars and Stripes, publication of.....	425
State institutions, statistical directory of.....	1677
States, financial statistics of.....	1675
States Relation Service (<i>see also</i> Experiment stations).....	1470
States Relation Service:	
Agricultural instruction in schools.....	1474
Boys' and girls' club work.....	1500
Boys' clubs.....	1491
County agents.....	1484
Editorial division.....	1472
Extension specialists.....	1491
Extension work in north and west.....	1492
Extension work with women.....	1497
Farm management demonstrations.....	1501
Farmers' institutes.....	1475
Finances.....	1483
Home demonstration work and girls' club work.....	1488
Statistical and economic associations, joint advisory committee of.....	1681
Statistical Year Book, international.....	1677
Statistics Branch, Army.....	633
Statistics, Division of.....	1638
Statistics of cities, general.....	1674
Steamboat-Inspection Service.....	1721
Steamboat-Inspection Service:	
Activities and statistics of.....	1722
Boiler pressure.....	1725
Licenses, examination of applicants for.....	1724
Organization.....	1721
Reconstruction.....	1723
Stockyards and live-stock dealers.....	1554
Storage Branch, Army.....	587
Storage reports, market.....	1548
Students' Army Training Corps, 1919, activities of.....	277
Submarine raids.....	913
Subtropical fruits.....	1319
Sugars, sugar derivatives, sirup.....	1387
Superannuation and retirement, Commerce Department.....	1597
Superannuation and retirement, Department of Labor.....	1938
Supervising Architect, office of.....	225
Supply, services of Army.....	397
Supreme Court of the United States.....	676
Surgeon General, honors to.....	1001
Synthetic glycerine formula.....	123
T.	
Tanks, Army.....	410
Tariffs, division of foreign.....	1641
Taxation.....	29
Taxes. (<i>See</i> Internal Revenue.)	
Tax exemptions of Victory Notes and Liberty Bonds.....	81
Telegraphs and telephones, postal.....	795
Telegraph and telephone service, Navy.....	986
Tenancy and farm-labor problems.....	1558
Territories.....	1182
Thread and twine, soft fibers for.....	1334

	Page.
Tick Eradication Division.....	1296
Tile dealers' case, Philadelphia.....	726
Timothy.....	1330
Tobacco, stocks of leaf.....	1675
Tonnage, ocean.....	401
Torpedo factory, Navy.....	957
Trades. (<i>See</i> Foreign and Domestic Commerce.)	
Trade commissioners, vital work accomplished by.....	1628
Trading-with-the enemy act.....	700
Enforcement of.....	885
Traffic Service, Army.....	578
Training camps, Army.....	277
Training of the Army.....	484
Training schools, national.....	768
Training school, naval.....	971
Training service, labor.....	1822
Transportation and storage.....	1527, 1534
Transportation by water, census of.....	1672
Transportation Corps, Army.....	406
Treasurer of the United States, report of.....	184
Treasury Department. (<i>See also</i> Treasury and Finances.)	
Abstracts of reports of bureaus and divisions.....	184
Accounts abroad, audit of.....	98
Appropriations for 1920.....	182
Army payments in Europe, funds for.....	97
Audit of accounts abroad.....	98
Bond and note designs.....	84
Bonds for Government officers, surety.....	153
Bonds, soldiers' and sailors' civil relief.....	134
Budget system, a.....	99
Capital Issues Committee.....	91
Certificates of indebtedness.....	46
Civil-service employees, retirement of.....	109
Coast Guard (<i>see also</i> Coast Guard).....	142
Comptroller of Currency, report of.....	188
Contingent fund.....	155
Contracting and purchasing.....	144
Coupon Liberty Bonds in permanent form.....	77
Cumulative sinking fund.....	71
Currency designs.....	85
Customs (<i>see also</i> Customs Service).....	135
Depositaries in foreign countries, United States.....	96
Economy.....	28
Engraving and Printing, Bureau of (<i>see also</i> Engraving and Printing, Bureau of).....	144
Engraving and Printing, report of.....	217
Estimates for 1921.....	182
Federal Farm Loan System.....	110
Federal Reserve System, the.....	86
Finances, annual report on (<i>see also</i> Finances).....	17
Financial condition of.....	17
General Supply Committee (<i>see also</i> General Supply Committee).....	148
Gold.....	92
Government agencies, incorporated.....	103
Government corporations and the railroad administration, checking accounts of.....	106
Government obligations, illegitimate traffic in.....	80
Internal Revenue.....	118
Internal Revenue, bureau of (<i>see also</i> Internal Revenue, bureau of).....	199
International High Commission (<i>see also</i> International High Commission).....	150
Liberty bonds, acceptance of as security.....	73
Liberty bonds and Victory Notes.....	60
Acceptance of in payment of Estate or Inheritance Taxes.....	74
Authorizations for issues of.....	78
Exchange and transfer of.....	68
Official titles of.....	78
Tax exemption of.....	81

Treasury Department—Continued.	Page.
Liberty bonds, conversion of.....	64
Liberty bonds, purchase of.....	69
Liberty loan, fourth.....	37
Liberty Loan subscriptions in default.....	76
Liberty loan, Victory.....	38
Loans and currency, report of (<i>see also</i> Loans and currency).....	247
Loans secured by obligations of the United States.....	75
Loans to foreign governments.....	53
Mint Service, report of (<i>see also</i> Mint Service).....	194
National banks, bond-secured circulation of.....	96
National Woman's Liberty Loan Committee.....	59
Panama Canal (<i>see also</i> Panama Canal).....	155
Public Buildings (<i>see also</i> Supervising Architect).....	140
Public debt.....	36
Public Health (<i>see also</i> Public Health Service).....	137
Public moneys and special depositaries.....	94
Public Moneys, Division of (<i>see also</i> Public Moneys, Division of).....	255
Revolving funds and reimbursements of appropriations.....	100
Salaries of Government officers and employees.....	108
Secret Service Division (<i>see also</i> Secret Service).....	257
Securities, issues of fraudulent and worthless.....	80
Secretary, report of.....	17
Seed-grain loans to farmers.....	113
Silver.....	92
Sinking fund, cumulative.....	71
Spanish-American War bonds, payment of.....	96
Treasurer of the United States, report of.....	184
Victory Liberty Loan subscriptions by persons in military and naval forces.....	73
Victory notes, interconversion of.....	68
War, cost of.....	31
War Finance Corporation.....	88
War loan publicity.....	58
War-risk Insurance (<i>see also</i> War-risk Insurance).....	123
War-savings certificates.....	49
War Trade Board (<i>see also</i> War Trade Board).....	154
Troops, expediting shipment of.....	360
Troops, necessity for use of since June 30, 1918.....	282
Troops returned to United States.....	394
Tropical and subtropical fruit insect investigations.....	1426
Truck-crop production, investigations of.....	1324
Tropical storms.....	1566
Tuberculosis Eradication Division, Bureau of Animal Industry.....	1298
Turkish waters, Navy in.....	946
Twenty-eight hour law.....	745

U.

Unemployment, measures for relief of.....	1939
---	------

V.

Vegetables and fruits, dehydration of.....	1393
Vegetable storage and storage life factors.....	1323
Vegetable-utilization work.....	1326
Venereal Diseases, Division of.....	243
Vessels in marine services.....	1579
Veterinary education.....	1315
Victory notes and Liberty loans.....	60
Victory notes and Liberty bonds:	
Authorizations for issues of.....	78
Exchange and transfer of.....	68
Victory notes, interconversion of.....	68
Virgin Islands.....	1028
Agricultural Experiment Station.....	1482
Virus act.....	747
Virus serum control.....	1316

	Page.
Vital statistics.....	1673
Viticultural investigations.....	1319
Vocational training, Navy.....	1000
Volcanology, investigations.....	1570

W.

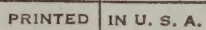
War (<i>see also</i> Army and Navy; American Expeditionary Forces):	
Accounts abroad, audit of.....	98
Activities—	
Department of Justice.....	691
Immigration.....	1880
Postal Service.....	779
Battleships' service in.....	901
Bonds, payment of Spanish-American.....	96
Cost of.....	31
Cost of to postal services.....	887
Department (<i>see also</i> Army)—	
Adjutant General's Department.....	331
Air Service, independent.....	324
Chief of Staff, report of.....	427
Claims in United States, settlement of.....	304
Contracts, settlement of war.....	293
Inspector General's Department.....	332
International obligations, liquidation of.....	300
Insular affairs.....	339
Liquidation abroad.....	305
Materials, sale of.....	306
Medical Department.....	332
Military justice.....	291
Military policy, permanent.....	309
Militia Bureau.....	339
Panama Canal.....	341
Sales abroad.....	302
Service schools.....	285
Secretary, report of.....	259
Finance Corporation.....	88
Fraud matters, investigation of.....	742
Labor Board, National.....	1779
Labor Policies Board.....	1794
Loan publicity.....	58
Marine Corps in.....	1002
Navy cost of.....	994
North Sea barrage.....	933
Plans Division, Army.....	482
Property, disposal of.....	653
Russia, American forces in.....	279
Savings certificates.....	49
Germany, American forces in.....	278
War-risk insurance.....	1033
Allotments and family allowances, military and naval.....	127
Amendments.....	133
Bureau of.....	206
Compensation, military and naval.....	128, 210
Government life insurance.....	132
Marine and seamen's.....	126, 206
Military and naval.....	130, 213
Military and naval allotments and family allowances.....	209
Organization of.....	125
War Trade Board, representation of Treasury on.....	154
War work:	
Census Bureau.....	1678
Coast and Geodetic Survey.....	1720
Miscellaneous census.....	1680
Warehouse act, administration of United States.....	1553
Waste-reclamation service.....	1615

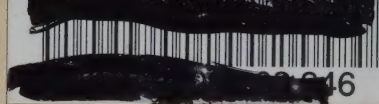
	Page.
Water power.....	1368
Water rights.....	756
Waterways, development of.....	1612
Weather Bureau:	
Aerological investigations.....	1570
Climatology.....	1572
Forecast service.....	1562
Highways weather service.....	1566
Instrumentation.....	1575
Meteorology, agricultural.....	1574
Post-war conditions.....	1559
Report of chief of.....	1559
River and flood warnings.....	1567
Seismology.....	1576
Solar radiation.....	1575
Stations and observations.....	1568
Telegraph service.....	1571
Tropical storms.....	1566
Volcanology, investigations of.....	1570
Weights and measures.....	1646
Welfare organizations, Navy gratitude to.....	983
Welfare work:	
Army.....	422
For the Army in the United States.....	289
Navy.....	980
West, agricultural extension work in.....	1492
Wheat.....	1316, 1331
White-pine blister rust.....	1353
White-slave traffic act, enforcement of.....	742
White-winged doves in Arizona.....	1447
Wild animals, autopsies of.....	1305
Woman in Industry Service.....	1798
Woman's Liberty Loan Committee, national.....	59
Women, agricultural extension work with.....	1497
Women in the Navy.....	1032
Woodchucks and beavers.....	1442
Wool sold at auction by Navy.....	988
Workers, training of.....	1938
Working conditions service.....	1853
World War. (<i>See</i> War.)	

Z.

Zoological Division.....	1312
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1919

U. S. President

Message from the president of
the United States to the two
houses of congress

